A Professional Press Publication

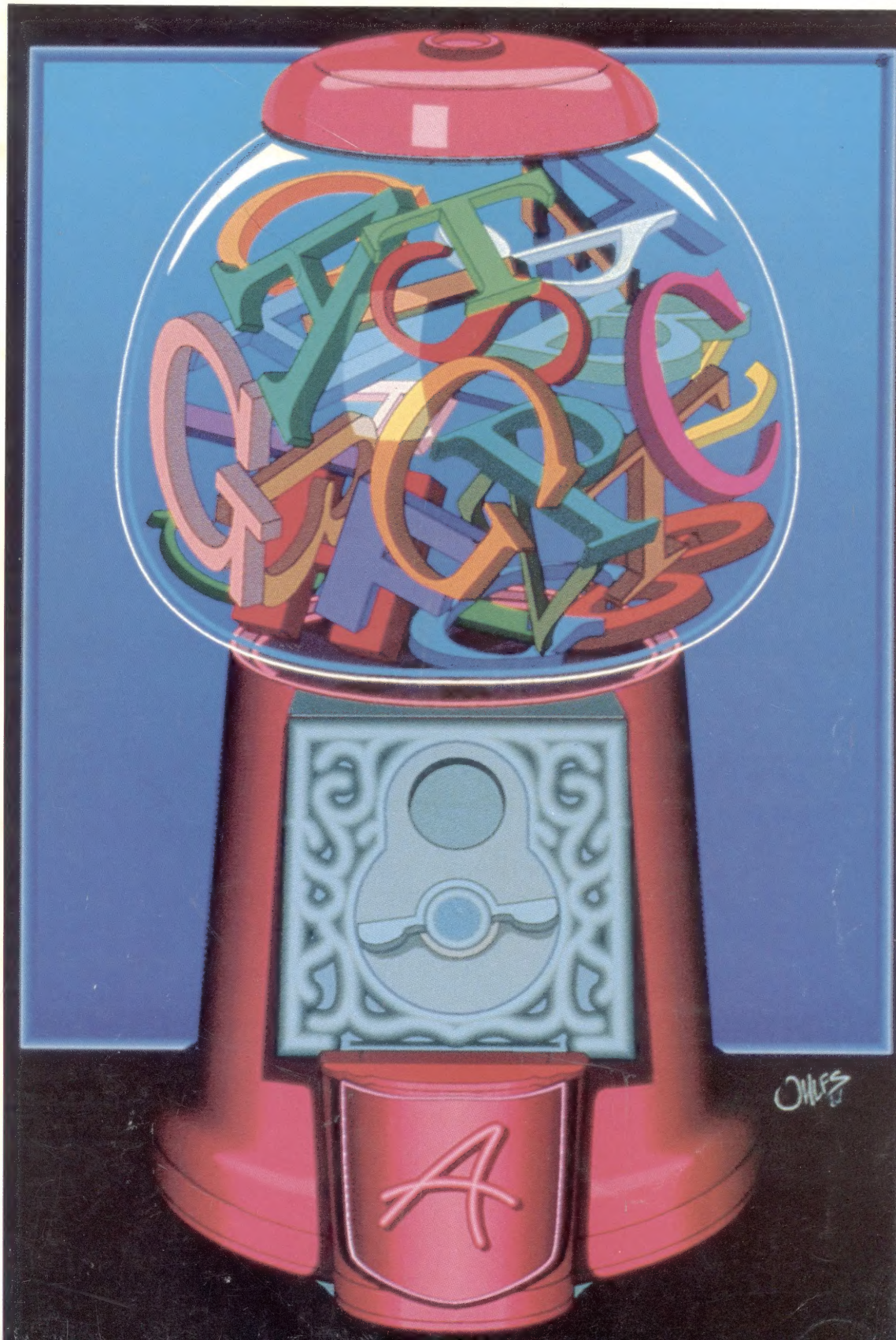
HP Professional

AN INDEPENDENT PUBLICATION FOR USERS OF HP COMPUTERS ■ VOL.3 ■ NO.11 ■ $4.0

NOVEMBER 1989

INDUSTRY WATCH

HP Says



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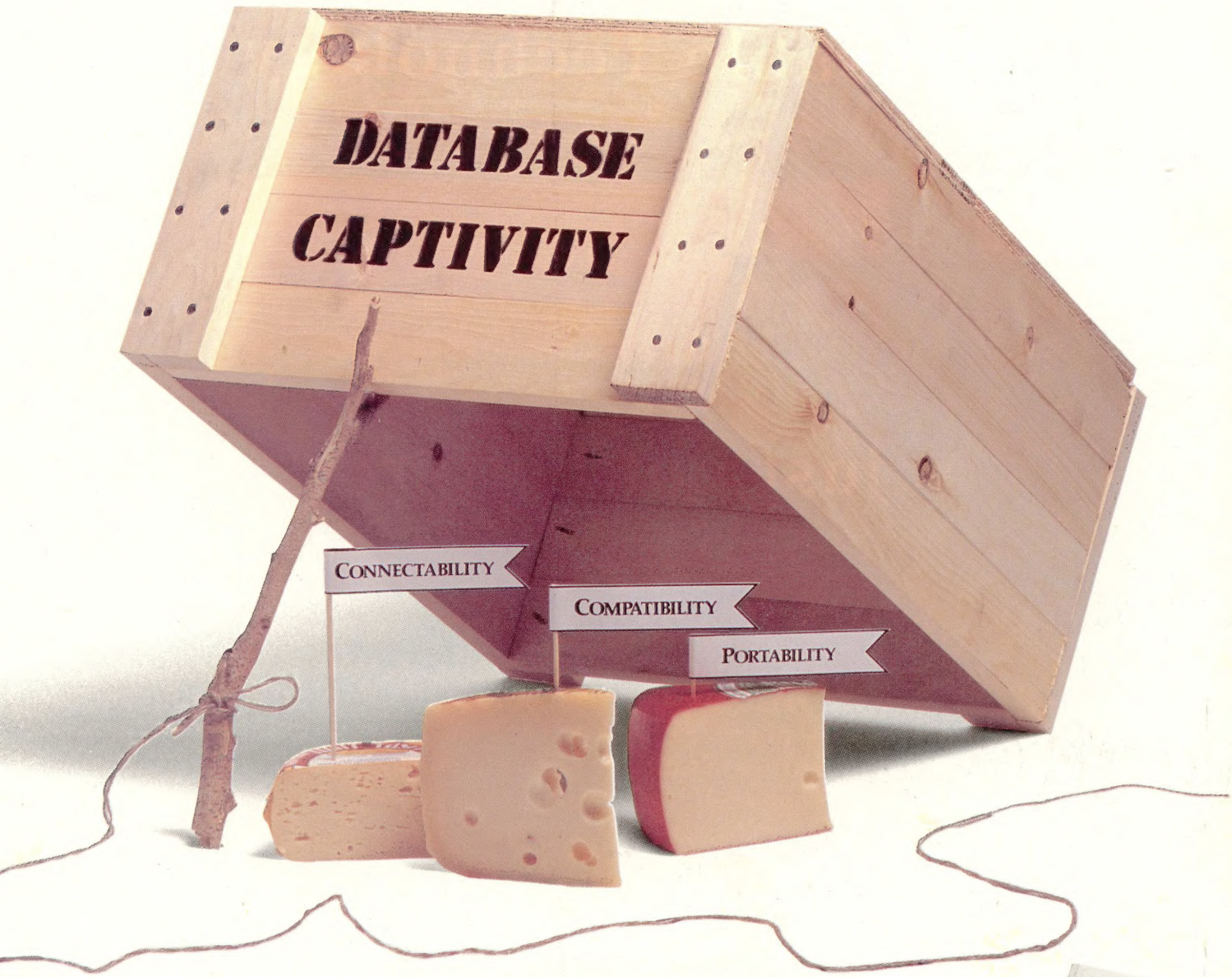

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Others may promise Compatibility, Portability and Connectability. But to what? **Not** to: MPE V, IMAGE, TurboIMAGE, HP SQL, KSAM, MPE, SPL, HP Editors, Utilities, Dictionary/V, System Dictionary, advanced terminal support, not to mention hundreds of 3rd party and HP application packages. In fact, **not** to most of the HP world!

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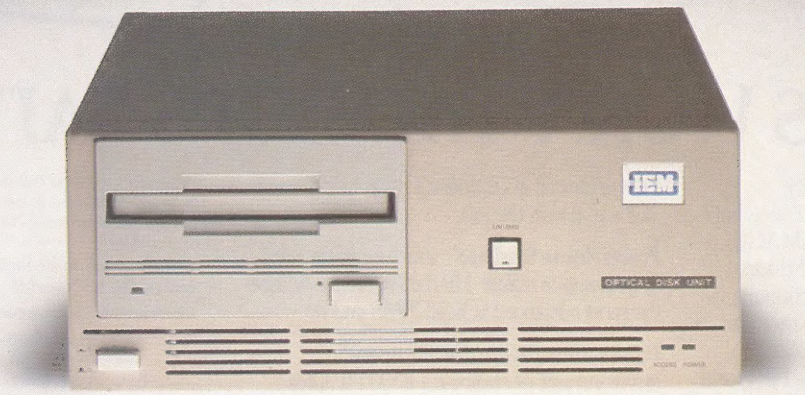

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Call For Papers: John S. Fusek of Virginia International Terminals (Newport, VA) won third place in the Call For Papers Contest for his article, "A Better Way To Move Cargo" (p. 50).

On The Cover:
Cover photo courtesy of Adobe Systems.

COLUMNS

DEPARTMENTS

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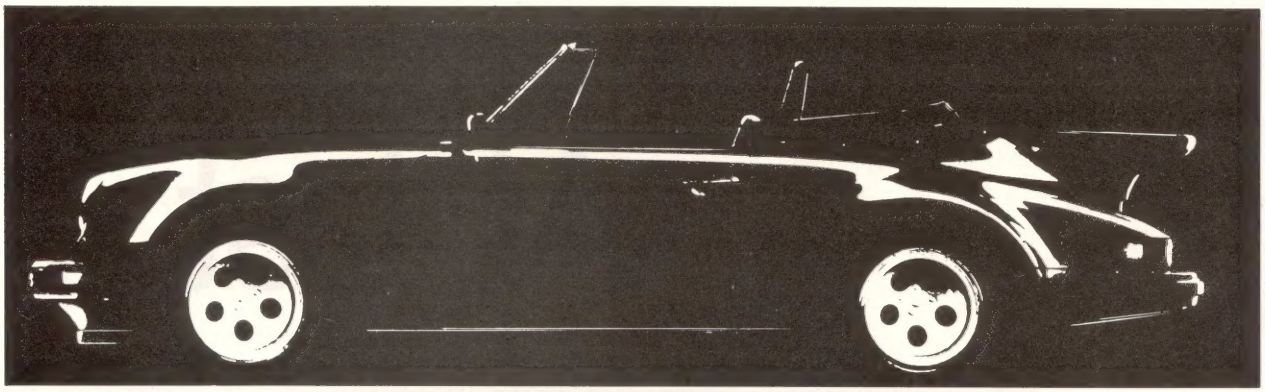
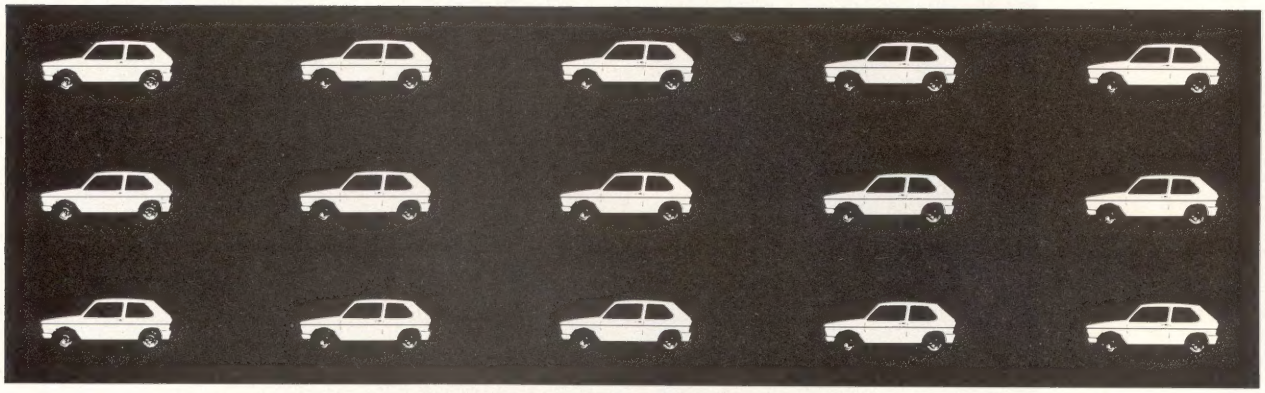


THERE'S CUSTOM.



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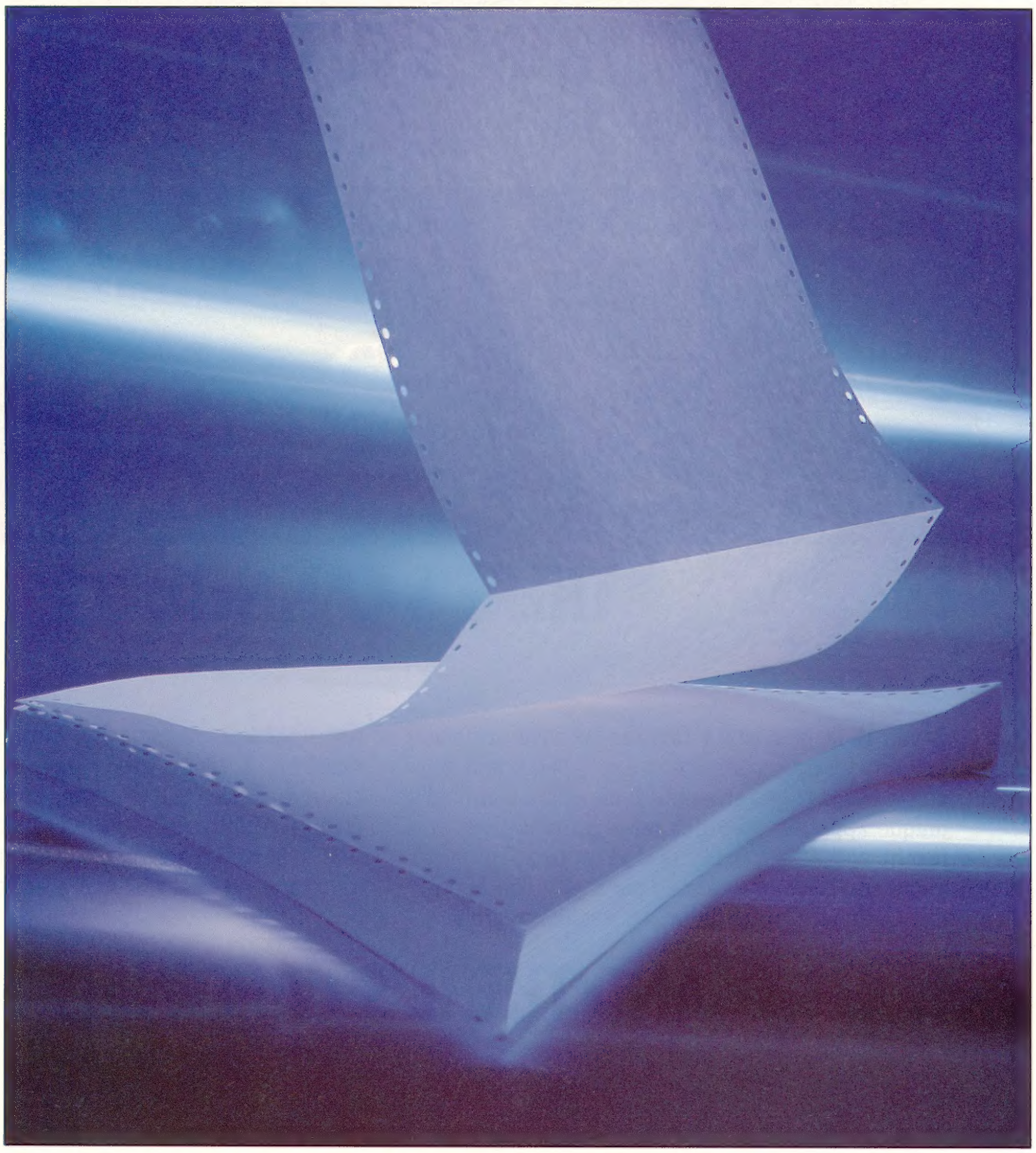

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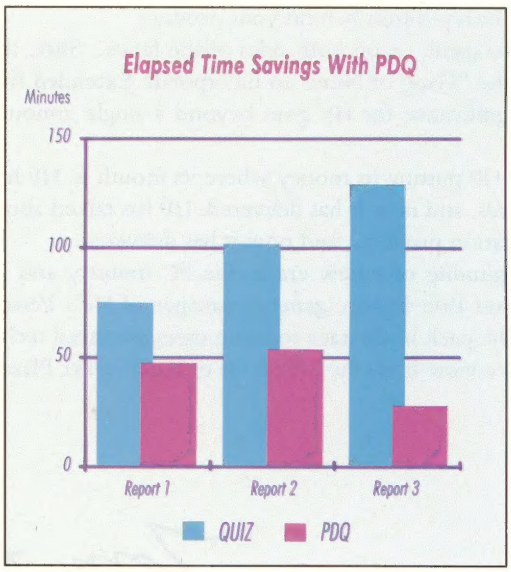

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CIRCLE 238 ON READER CARD

A Room With A View

In keeping with its new aggressive attitude, Hewlett-Packard chose to announce the premier of its Vectra 486 PC in the Rainbow Room on the 64th floor of Rockefeller Plaza in New York City.

If, as one HP exec said, you want to be a "major player" in the marketplace, then you have to recognize the importance of being "first" to market.

What better place to announce the new EISA-based 486 PC than among the powerbrokers in Midtown Manhattan? If you're going to go up against Big Blue's Micro Channel standard, then you certainly don't announce your challenge in Palo Alto. No, you take the game to the opponent's home turf.

And, you also bring along a strong bench — Microsoft, Santa Cruz Operations, Novell, Intel and AutoDesk — to take on the always skeptical East Coast trade and business press in order to prove that you have some heavy-hitters behind your product.

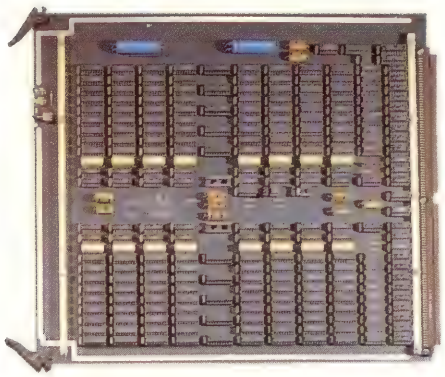
HP is finally learning the game — on both sides of the fence. Sure, the Vectra 486 PC is the first 32-bit machine from the "Gang of Nine" to incorporate Extended Industry Standard Architecture (EISA). But the significance for HP goes beyond a single announcement introducing a new PC.

The significance lies in HP putting its money where its mouth is. HP has repeatedly promoted its committment to standards, and now it has delivered. HP has talked about becoming aggressive and rolling out next-generation products, and now it has delivered.

"Today markes the beginning of a new era in the PC industry and for HP as a supplier of high-performance PCs," said Bob Puette, general manager of HP's Personal Computer Group. "HP has moved ahead of the pack in the race to bring users advanced technology."

On a clear day, it's a nice view from the 64th floor of Rockefeller Plaza.

HOW TO GET EVERYTHING OUT OF A SPECTRUM THAT HP PUTS IN.



EMC's 95X Spectrum Memory for HP 3000 950/955 Systems.

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CIRCLE 113 ON READER CARD

LETTERS

MEMORY BOARD SUPPLIER

To The Editor:

I was very distressed to see that Eventide was not included in the listing of third-party memory board suppliers in your August 1989 issue.

Eventide was, to the best of my knowledge, the second company to enter the HP add-in business, long before all the listed companies, except Infotek, whose history dates back to the HP 9830 desktop. We started out making boards for the 9845 and sold many hundreds of them. We still have boards from 256K through 2 Meg available for this machine, although manufacturing has been discontinued.

For the Series 200-300, we currently offer 256K (HP trade-ins), and 512K, 1 Meg, 2 Meg and 4 Meg of our own manufacture for the 200 and 310/320 machines. We were the first to offer these boards. For the newer Series 300 machines, we currently are shipping boards for the 360 and have boards for the 330/350/370, 340 and 332 in the works.

In addition to memory boards, we also make accessories for HP computers, including the Expressway and Cloverleaf, an HP-IB ROM programmer and others.

All of our memory boards and other products are manufactured at our plant in Little Ferry, NJ. We also manufacture audio and avionics equipment, which gives us a large work force and the flexibility to make boards at any rate required. Our prices and warranty are competitive with the other third-party folks and, of course, are drastically lower priced and guarenteed longer respectively than HP's. We take pride in the quality and reliability of all of our products. Our aircraft moving map display (the Argus 5000) is being used in many hundreds of aircraft for navigational guidance, and its manufacture is "TSOd" by the FAA, which conducts periodic inspections of our facility.

We've been making memory products for a long time, and I wouldn't want anyone to get the impression that we've suddenly vanished!

Richard Factor, President
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A 1990 PREVIEW

As 1989 draws to a close, we'd like to give you a preview of what you can look forward to in HP Professional next year.

Our 1990 editorial calendar addresses the major topics that you've told us you want to read more about — UNIX, Networking, Workstations, PCs, MPE/XL, System Support and more.

In addition, we'll provide in-depth analysis of the major issues affecting Hewlett-Packard, new product announcements and lab reviews. Plus we'll keep you abreast of industry trends.

We've designed each issue to accommodate the entire Hewlett-Packard and third-party market to provide a complete and well-rounded magazine covering Hewlett-Packard and related products and services.

Here's a sampling of what you can expect to read about next year:

- January — UNIX In The '90s.
- February — Financial Services.
- March — Multivendor Networking.
- April — User Interfaces.
- May — System Support.
- June — Design Engineering.
- July — Site Management.
- August — Peripherals and Add-ons.
- September — Electronic Document Management.
- October — Workstations.
- November — Manufacturing.
- December — Storage Technology.

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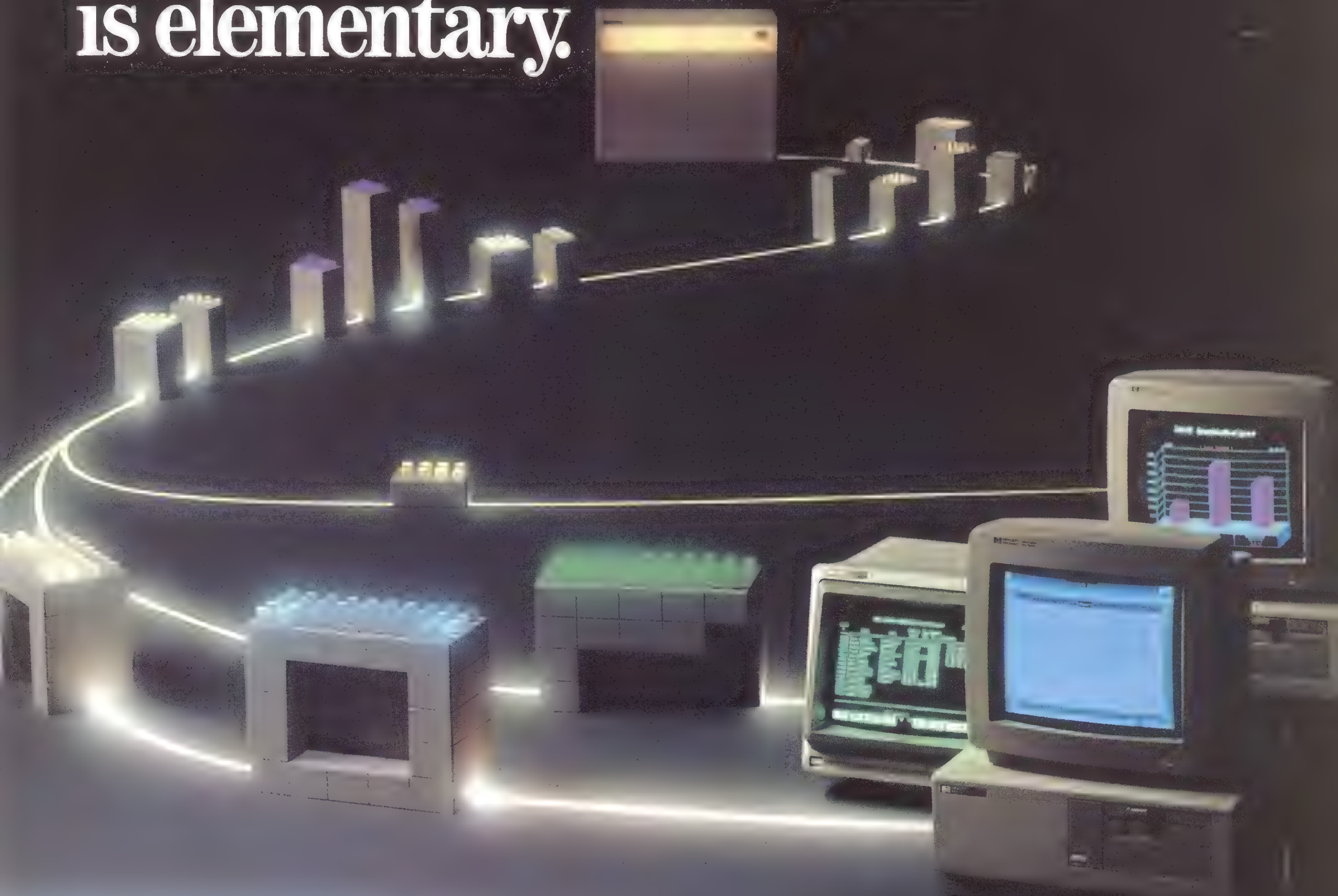

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HP 3000 RELOAD

QUERY:

Billy Bordelon *(SIG 12/MESS 2)*: I'll be doing a reload on our HP 3000. What option is best? What should I watch for?

REPLY:

V. James Krammes *(SIG 12/MESS 3)*: Reload with the <ACCTS> option. This recovers your accounting structure and system files (drivers, ININ, INITIAL, SL, etc.) without restoring any user files. Use your most recent backup for this, even if it was a partial backup.

After the reload, use a :RESTORE to bring back user files. Use your most recent full backup with the command:

```
:RESTORE *T;@.@.@;SHOW=LONG,
   OFFLINE;KEEP;FILES=30000;OLDDATE
```

The old date may be very important. If you leave it off, your next backup (partial or full) will back up all of your files, and you'll lose date information in the file label. They'll all be set to the date of the reload, with the possible exception of the creation date.

If you have any partial backups between the full backup and the reload tape, do another restore without the KEEP option from the most recent one.

Some side effects:

- Files that were purged between the full backup and the reload tape will reappear.
- If you purge any groups/accounts between the full backup and the reload, you get error messages like: GROUP/ACCOUNT/CREATOR NOT IN DIRECTORY. Examine them carefully making sure important files got restored.
- Once you've started a reload, there's no turning back. All your disc-free space maps will be initialized. If something goes wrong, your only options are re-reload or re-install.

If you can, get a full backup before the reload. Then you only need one restore after the reload, and your directory problems (missing groups, creators, etc.) will be minimized. However, there still may be files on your system whose creator's are dearly departed.

Often, it's impossible to get a backup before reloading, like when you ignore the message that says: "DO NOT INTERRUPT UNTIL YOU SEE THE * WELCOME * MESSAGE." In these instances, do the best you can.

How To Use ARIS/BB

Subscribers to *HP PROFESSIONAL* can call up our online bulletin board and log into ARIS/BB, our **A**utomated **R**eader **I**nformation **S**ervice. In ARIS/BB, you can download programs from this publication, communicate with our editors, request a change of address, find additional information about advertisers, order books and back issues, check the guidelines for submitting articles, take a peek at our editorial calendar for the year and communicate with other HP users.

To log in, you'll need your subscription number from your mailing label. Set your terminal to seven data bits, one stop bit and space parity, or eight data bits, one stop bit and no parity. Set your terminal emulation to VT100 and dial:

(215) 957-1000 - Pennsylvania
(818) 577-9100 - Southern California
(415) 873-2135 - Northern California
(617) 863-5010 - Massachusetts
Baud rates: 300, 1,200 or 2,400.

After the CONNECT hit Return two or three times.

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SIG Identification

The SIG categories referenced in this month's *ARIS*TALK are:

12 ..... Site Management
26 ..... Communications/Networking

VAX TO HP 1000

QUERY:

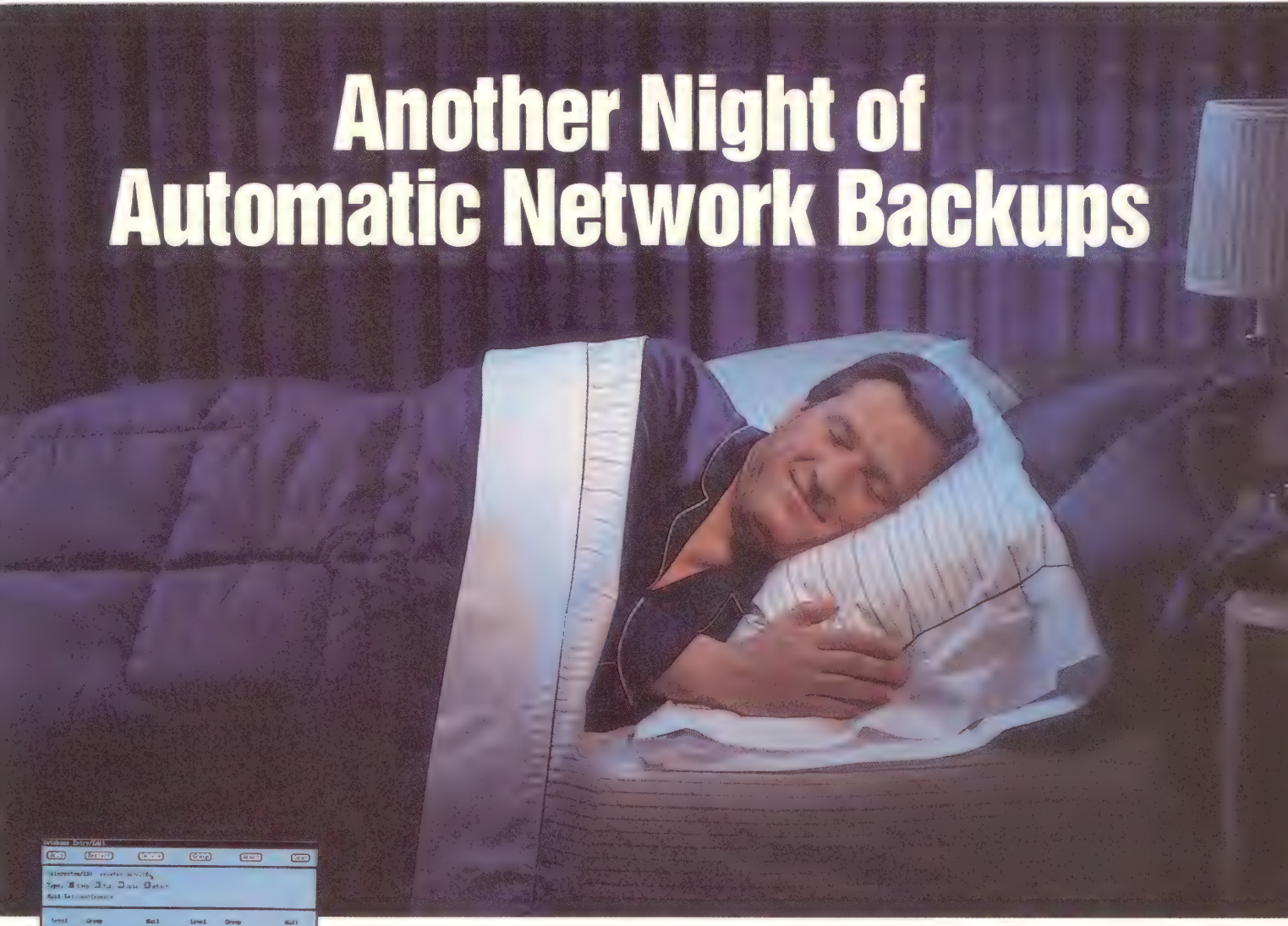
Stephen Tatrai *(SIG 26/MESS 7)*: I'm supporting a research group that uses an HP 1000 and will be working on a VAX. Are there any software packages to connect the two? Also, how can an HP 150 terminal be used as a terminal to the VAX.

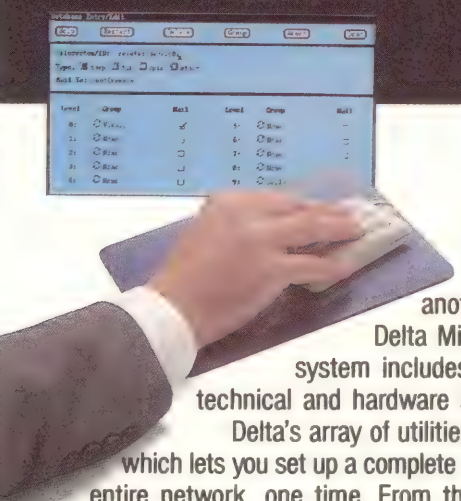
REPLIES:

Richard B. Gilbert *(SIG 26/MESS 8)*: How would you like to connect your HP 1000 and your VAX? What do you want to use the connections for? I need more information to work with. Among the possibilities are sneaker net, i.e., to carry physical media (tape or disc) between the two machines; a serial line and Kermit; and Ethernet with a TCP/IP package on each end. Unless your HP 150 terminal has a VT100 emulation, you'll be much better off buying DEC or DEC-compatible terminals to use with your VAX. HP terminals use a protocol that isn't ANSI standard. DEC terminals use a superset of the ANSI standard. They take full advantage of DEC's screen editors, the PHONE utility, the MAIL utility and probably a few other things.

David Beorn *(SIG 26/MESS 9)*: Not all HP terminals can't talk to DEC. My 2623A has an ANSI mode that works nicely with my VAX, connected directly to a port. However, it needs to be cut down to either 4,800 or 2,400 baud to handle output to the screen without being overflowed and resulting in garbled characters when you send multiple screens of information. I'm not sure why (no buffering and/or no XON/XOFF), but this has proven to be a satisfactory set up. I use it as a spare, but am considering it for home use because I only have 2,400 baud to dial-up. ■

Another Night of Automatic Network Backups





When you buy Delta, you buy peace of mind. More than just another 2-Gb tape drive, the Delta Microsystems 2000T subsystem includes software and the best technical and hardware support in the industry.

Delta's array of utilities includes the *bud* utility which lets you set up a complete backup operation for your entire network, one time. From then on you just insert a tape and *bud* carries out the scheduled backup operation. Other Delta utilities can be used to pre-certify your tapes, monitor and maintain data integrity, maintain a table of contents and exercise the drive. Delta's custom driver was developed especially to take advantage of the unique features of the 2-Gb tape drive. When you buy Delta, you buy a complete solution.

Delta's commitment to excellent customer support means that you not only can talk to a trained customer representative, but you also have access to the authors of your drivers and utilities. Delta develops all its software in-house and is committed to supporting future operating systems and architecture. When you buy Delta, you buy support.

We know how valuable an engineer's time is, and how costly down-time can be. That's why, if you call Delta with a suspected drive problem, we'll ship you a replacement overnight, free of charge. When you buy Delta, you buy service.

Delta is consistently at the forefront of developing technology. Delta supports a full range of SCSI peripherals including WORM (Write Once Read Many) optical, CD-ROM, Winchester, erasable optical and DAT (1-Gb helical scan) tape subsystems. The 2000T tape subsystem is supported on a range of workstations including those from Sun, Hewlett-Packard, Silicon Graphics and Solbourne. When you buy Delta, you buy versatility.

Some of the most respected names in the industry, including Sun, Hewlett-Packard, and AT&T, buy Delta. When you buy Delta, you're not alone.

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CIRCLE 177 ON READER CARD

INDUSTRY WATCH

Peggy King

HP Says Adios To Laptops

Digital had its personal computer fiascos, IBM its dud of a workstation and HP its four successive attempts at producing the ideal laptop for HP 3000 users.

Recently, HP announced that it will discontinue the Japanese-made, Zenith-OEMed HP Vectra LS/12 laptop — just nine months after it was introduced. The Portable Plus and Vectra CS also were discontinued this year.

According to Mike Naggiar, director of marketing for the Personal Computer Group, "HP had been spreading its resources too thin. We choose not to continue to invest in laptops. Instead, we will identify and qualify other laptop vendors."

In the five and a half years since the HP 110 laptops first rolled off the production lines in Corvallis, OR, HP has introduced four different models of laptop, each one substantially different from its predecessor. Each of the HP-manufactured laptops had technologically innovative features, but none of these high-priced machines attracted a large customer base in a laptop market dominated by Japanese companies with aggressive pricing policies and short product development cycles.

Why did HP give laptops yet another try after having discontined three Corvallis-manufactured models in less than five years? I attribute the decision to HP's concern with offering its minicomputer customers a complete computing solution. If HP had paid as much attention to making its laptops IBM PC-compatible as it did to making them HP 3000-compatible the first time around, an enhanced version of the original HP 110 design might have become as profitable and popular a product as the portable ThinkJet printers that were introduced around the same time. Instead, used ThinkJets sell for $250, a little more than half of the $495 retail price, while the HP 110 laptops sell for as little as one fifth of their original retail price. (Prices are from the Portable Equipment Exchange's September 1989 catalog.)

From Corvallis Manufacturing To Sunnyvale Marketing

Why did HP move its laptop marketing operations to the Personal Computer Group in Sunnyvale although few of the Corvallis engineering staff followed? I don't know the motivations for this move, but the decision to relabel and enhance a Zenith machine rather than develop a replacement for the Vectra CS portable indicates that HP was more concerned with getting a new laptop to its customers quickly than with evolving a better design and manufacturing process for its laptops.

I hate to see a product line die, but the HP laptop was in its death throes even as the Zenith models were introduced. Apparently not much forethought was given to customers' future needs. For example, why had the marketing group not thought about customers who might want to use the NewWave environment? If HP had chosen to resell or manufacture a laptop that had EGA (Enhanced Graphic Adapter) instead of CGA (Color Graphic Adapter) level displays and 2 MB of RAM instead of 1 MB, it would have been possible to run NewWave.

Had laptops been an important priority for HP, the Corvallis production line probably would have continued to produce them. That engineering group could have used its expertise in LCDs and low-cost manufacturing to provide a lightweight industry standard that retained the innovative features of the Portable Plus and utilized the latest advances in surface mount technology and automatation for low-cost manufacturing.

But, if HP is not committed to designing and producing laptops that live up to its reputation, it's best for HP's customers to be served by a variety of vendors whose products are upwardly compatible with minicomputers and desktop PCs, than to have one more expensive and less powerful choice from HP. ■

FIGURE

HP Laptop Prices — New and Used

Used prices are from the September 1989 catalog for Personalized Software's Portable Equipment Exchange

HP Laptop	Introduction Date	New Price	Used Price
HP110	June 1984	$3,000	$595
Portable Plus w/128KB RAM	July 1985	$3,190	$995
Portable Plus w/512KB RAM	July 1985	$3,395	$1,595
Portable Vectra CS	October 1986	$3,895	$1,895
Vectra LS/12 w/20MB hard disc	January 1989	$4,879	na
Vectra LS/12 w/40MB hard disc	January 1989	$5,479	na

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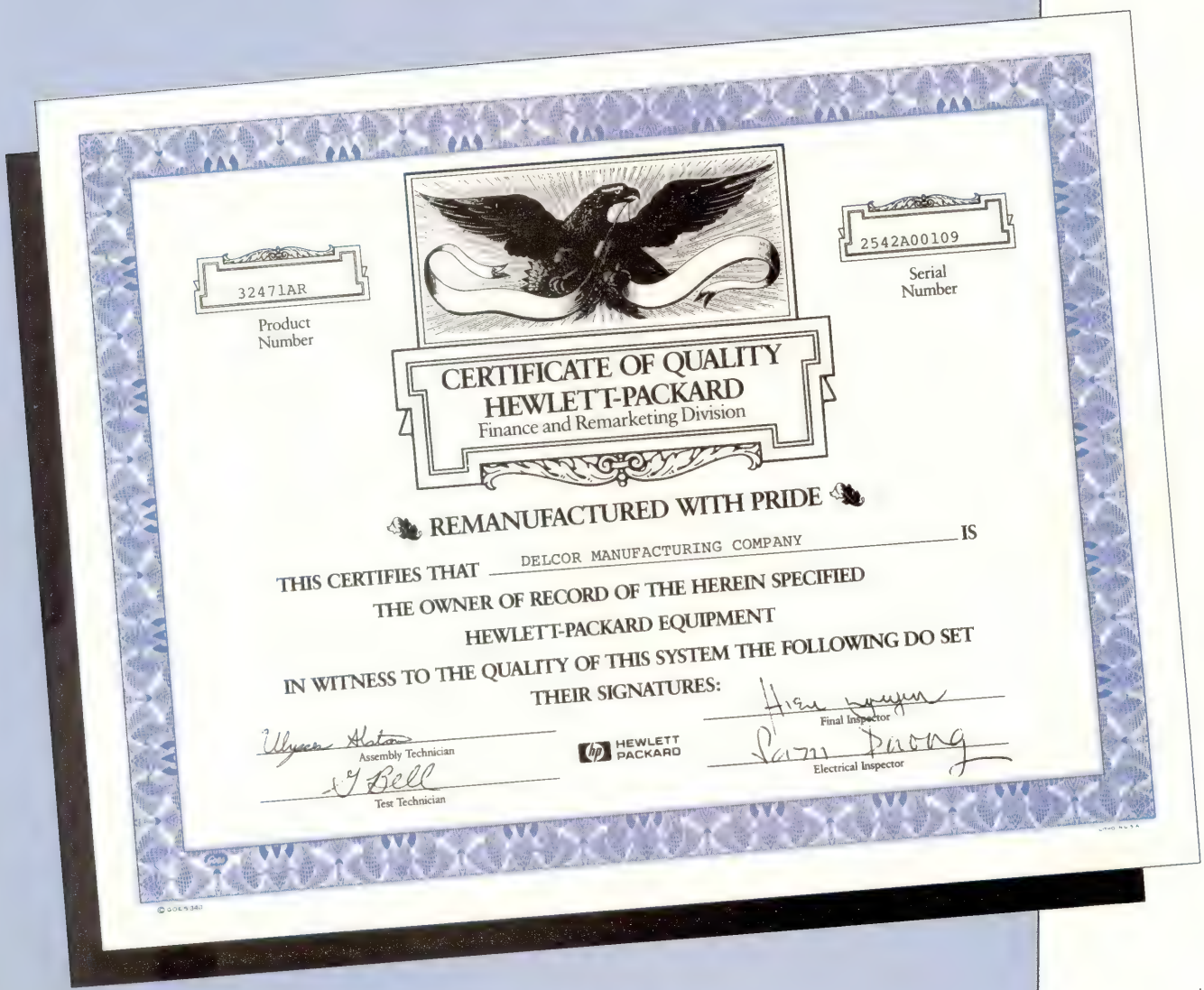
Who says you can't improve on a good thing?



Hewlett-Packard products have long been synonymous with high quality. Now, you can get that same quality in HP's line of **remanufactured equipment** for **less money**—and with the **same warranty** as new HP products.

But that's not all. When you buy remanufactured products from Hewlett-Packard, HP's team of sales, service and support people stand ready to provide the added value you can't get anywhere else.

Here are a few of the many services HP provides at no extra cost to you:

- Pre-shipment site preparation and verification
- A thorough implementation support and service plan
- All documentation, manuals and cables
- Insured equipment delivery
- Complete installation

In other words, more for less.

The remanufactured products solution from Hewlett-Packard.

There is a better way.

HEWLETT PACKARD

CIRCLE 143 ON READER CARD

NEWS & TRENDS

SCO UNIX Available On Vectra PC

Users Can Upgrade To Multiuser System

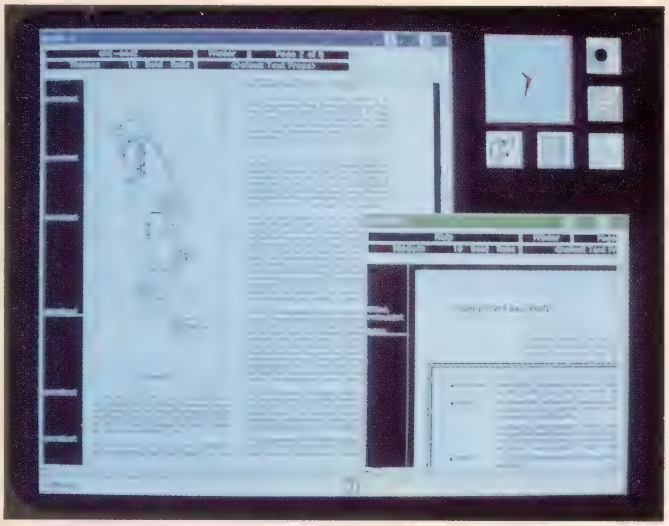
The Santa Cruz Operation held its third annual SCO Forum at the University of California, Santa Cruz campus. During the conference, HP and SCO together with Corollary Inc. (Irvine, CA) announced plans to offer complete Vectra PC-based multiuser UNIX systems. Hewlett-Packard will include the SCO UNIX System V/386 release 3.2 operating system with all Vectras that have Intel 80386 microprocessors.

In addition, HP will market a custom version of Corollary's Serial I/O Subsystem. This subsystem, also known as a terminal concentrator, allows an entire office with up to 32 users to share a single Vectra running SCO UNIX. By combining the access to multiple terminals with a UNIX operating system, HP becomes the first vendor to offer minicomputer capabilities on an Intel 386-based platform.

According to Bob Puette, general manager of HP's Personal Computer Group, more than 10 percent of the 386-based Vectras already have a UNIX operating system. Customers who bought SCO Xenix can upgrade their system to SCO UNIX. Larry Michels, president and cofounder of SCO, sees the agreement with HP as an opportunity to expand sales of SCO's multiuser products because HP has many large corporate accounts.

Under the agreement with SCO, there will be worldwide distribution and support of SCO UNIX for 386 Vectra PCs. One of the targeted markets for multiuser Vectras are departments within Fortune 1000 companies, an area that already is an HP stronghold. Other targeted markets include small and medium-sized businesses, especially in Latin America and the Middle East, and franchises that want to install one Vectra at each location.

Vectras that run SCO UNIX will conform to POSIX and X/Open. The system provides security up to the C2 level. SCO also offers industry-standard networking with a TCP/IP product available and an OSI product under development. —*Peggy King, West Coast Editor*



Interleaf's Core TPS publishing software.

Apollo Division Announces Interleaf Distribution Agreement Regarding Core TPS

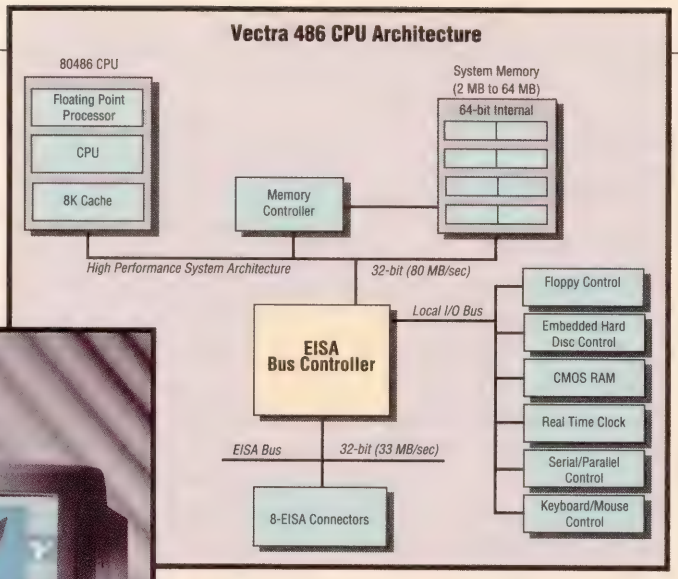
Apollo To Market Core TPS Publishing Software

Hewlett-Packard, through its Apollo Division, announced an agreement with Interleaf Inc., under which the Apollo Division will market and distribute Interleaf's Core TPS publishing software on Apollo Series 3500 and Series 4500 personal workstations.

With Core TPS, text is entered, formatted and paginated in the typeface and style of choice automatically. It provides the flexibility to design structured or free-form documents in the page size and layout required.

Core TPS features a simple, icon-based user interface. Documents created with other Interleaf packages are fully compatible with Core TPS. Output of Core TPS documents may be sent to Impress and PostScript-compatible laser printers.

Core TPS U.S. list prices start at $1,250 per license, $1,150 each for two to 10 licenses.



The HP Vectra 486 PC is the first of Hewlett-Packard's new generation of PCs based on the Intel i486 microprocessor and the Extended Industry Standard Architecture (EISA).

HP Presents New EISA-Based PCs

New Generation Of i486 Vectras

In what one executive called "the beginning of a new era in the PC industry," HP last month introduced its new generation of PCs based on the Intel i486 microprocessor and Extended Industry Standard Architecture (EISA).

"This is a significant announcement to the PC industry and from HP as a PC supplier," said Bob Puette, general manager of HP's Personal Computer Group. "We recognize the importance of being first to market. We gave ourselves a challenge about a year ago to be among the first, if not the first, to come out with a 486 machine."

Speaking at a press conference in New York City, Puette pointed out that the HP Vectra 486 PC is the first EISA-based system from a member of the "Gang of Nine," a consortium of U.S. and foreign computer companies that created the EISA standard as an alternative to IBM's Micro Channel standard used in IBM's PS/2 PCs.

The Vectra 486 delivers minicomputer-level power and is geared towards such applications as computer-aided design (CAD), departmental multiuser computing and LAN server function.

The 25-MHz Intel i486 allows the Vectra 486 PC to operate more than 33 percent faster than 33-MHz Intel 386-based PCs. It also achieves more than twice the floating-point performance of a 33-MHz Intel 386 system with a 80387 coprocessor.

Vectra 486 memory subsystem includes an HP-designed memory controller that enables the i486 to communicate with system memory at the maximum clock speed using zero-wait-state memory cycles. This also allows up to 64 MB of memory to be added directly to the main-system board, which is two-to-four times the maximum on-board memory on today's Intel386-based PCs.

The new Vectra will be available early next year. Depending upon configuration, list prices will range from $13,999 to $19,999.

The HP Vectra 486 will be available in three standard models:

Model 150—2 MB of RAM; one 5 1/4- inch, 1.2-MB flexible-disc drive; one 152-MB hard-disc drive. List price, $13,999.

Model 330—2 MB of RAM; one 5 1/4- inch, 1.2-MB flexible-disc drive; one 330-MB hard-disc drive. List price $16,999.

Model 670—2 MB of RAM; one 5 1/4-inch, 1.2-MB flexible-disc drive; one 670-MB hard-disc drive. List price, 9,999. — *Tom Halligan, Managing Editor*

HP Introduces UNIX Multiuser Program For PCs

HP also introduced in New York its PC multiuser program, a broad range of products and marketing tools that provide users and dealers the hardware, software and support necessary for multiuser PC systems.

Up to 64 terminals can be connected to the new HP Vectra 486 PC or Intel386-based HP Vectra PC running the SCO UNIX System V/386 Release 3.2 operating system. MS-DOS applications software is supported under SCO UNIX with VP/ix.

The HP PC multiuser program features the following new products: SCO UNIX System V/386 Operating System (U.S. list $895); the HP Terminal Multiplexer Kit, including an interface card; a terminal concentrator for connecting up to eight HP or industry standard terminals, and two cables (U.S. list $1,595); the stand-alone Terminal Concentrator Kit for connecting up to eight additional terminals (U.S. list $895); VP/ix software (U.S. list $895); and a new 120-MB tape backup device.

Earthquake '89

HP Suffers Minimal Damage

Just two days after the major earthquake that struck the San Francisco Bay Area, Hewlett-Packard reported that most of its Bay Area facilities were back in operation.

HP's corporate headquarters in Palo Alto, located 30 miles north of the epicenter, survived without major structural damage. The company's central computer facility was not damaged and customer orders and other data continued to process as usual.

HP maintains facilities in San Jose, Santa Clara, Cupertino, Palo Alto, Sunnyvale, Santa Rosa and Rohnert Park. Some of these buildings suffered damage and some activities were halted while structural inspections took place.

In response to requests for emergency funding, Hewlett-Packard donated $100,000 to the American Red Cross for use in recovery activities.

Levi Strauss Implements Sales-Automation Program

To Use Gateway Systems, HP Products

Levi Strauss International (LSI) will use cooperative-processing software from Gateway Systems Corp. on Hewlett-Packard computers to develop a worldwide sales automation and productivity program. LSI is one of the first consumer-goods manufacturers to automate its sales operations.

Gateway Systems' Synergist software will be used by LSI to develop a customized sales force automation application. Cooperative-processing software, such as Synergist, allows a task to be divided between PCs and a host minicomputer system. By using HP AdvanceMail and HP DeskManager electronic-mail software programs, LSI sales representatives will be able to enter sales orders remotely using a PC and access customer and inventory information stored on LSI's central HP 3000 minicomputers.

Sales representatives participating in the program will use industry-standard portable computers running on MS-DOS Version 3.0. Internal modems will provide access to HP 3000 minicomputers throughout LSI's communications network.

John Young Delivers Keynote Address At World Computer Conference

First Conference Held In U.S. Since 1965

HP's President and CEO, John A. Young, delivered the keynote speech at the Eleventh World Computer Conference held recently in San Francisco.

The conference, held every third year, is sponsored by the International Federation for Information Processing (IFIP), a multinational federation of organizations with members in 59 countries.

The IFIP Congress was last held in the U.S. in 1965. According to Young, this was a year when "the (Silicon) Valley had more apricot trees than electronic startups," and Hewlett-Packard was working on its first computer, "which people at the company thought of as an instrument controller."

HP President and CEO, John A. Young

His speech, entitled "Standards and the Computer Industry," addressed the question of how vendors can respond to the demands for standards while continuing to differentiate themselves from their competitors. Young told attendees that the computer industry's movement toward standards was "even more inevitable than the delay you'll face at the airport on your way home."

Young refuted the idea that standards lead to commodity products. "It's my belief — and that of the Hewlett-Packard Company — that standards won't lead to sameness in the computer industry. Instead they'll usher in a whole new richness in the variety and usefulness of computer solutions available."

Young continued to describe ways that vendors can differentiate themselves while continuing to adhere to standards: by implementing a standard better than the competition does, by using a standard to create new modular hardware and software building blocks that can be combined in interesting ways, by going beyond a standard, by adding functionality within a standard, or by extending a standard in new directions.

Generally, people view the move toward standardization as an advantage for customers but a disadvantage for vendors. Young pointed out some ways that adherence standards also help vendors. "It will free up our R&D Resources. We'll stop reinventing the wheel... Instead we'll have a base of technologies to build on." —*Peggy King, West Coast Editor*

Bell Northern Research Selects 'The Publisher'For Documenting Switching Systems

Electronic Publishing Software To Be Ported To HP/Apollo Systems

ArborText Inc. and Bell Northern Research (BNR), (Ottawa, Ontario) announced a worldwide site licensing agreement for the use of ArborText's electronic publishing software called *The Publisher* by Bell Northern Research.

The agreement defines specific enhancements that ArborText will make to *The Publisher*, which currently operates on Sun systems. In addition, *The Publisher* will be ported to HP and Apollo systems under X-windows (Version 11). A version of *The Publisher* also will be provided under X-windows for the Sun systems.

Contact ArborText Inc., 535 W. William St., Suite 300, Ann Arbor, MI 48103; (313) 966-3566.

Circle 400 on reader card

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but we improved it.

Nobody here at Mt Xinu looks much like Alexander Graham Bell. . . and none of us invented the Unix™ system for research and development, either. However, we've built the only fully-supported, up-to-the-minute version of Berkeley 4.3BSD for Hewlett-Packard and VAX computers. Loaded with the latest: NFS 4.0, "Tahoe" networking improvements, diskless client support, even the best of System V.

When you have MORE/bsd in binary or source code and pick up the phone and talk to someone who understands what you're up against on the frontiers of research, education and software development, you know you've got the right system . . . and what seems like a better phone, too. We suggest you pick up yours, call us now and say something like, "Watson, come here, I want you." We'll understand.

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In the research tradition: Unix system software for Hewlett-Packard and VAX computers.

MORE/bsd is available for Hewlett-Packard 9000 (Series 300 now, Series 800 in development) and most VAX computers. Registered trademarks mentioned and their respective holders include: Unix and System V, owned by AT&T; VAX, by Digital Equipment Corporation; NFS, by Sun Microsystems, Inc.; MORE/bsd, by Mt Xinu.

CIRCLE 160 ON READER CARD

PC/FOCUS First To Ship Complete Toolset For SQL Server

Functions Identical To FOCUS Systems

Information Builders Inc. recently became the first DBMS software vendor to offer a complete application development and decision support "front end" for the Ashton-Tate/Microsoft SQL Server. The immediate availability of FOCUS for SQL Server, an optional read/write interface for PC/FOCUS for OS/2, delivers the full functionality of the SQL-based relational DBMS server through the familiar FOCUS language and tool set.

PC/FOCUS for OS/2 offers report writing, application development, business graphics and communications facilities identical to (and fully compatible with) FOCUS systems for mainframe, UNIX, VAX, Hewlett-Packard, DOS and local area network (LAN) environments.

FOCUS for SQL Server is a read/write interface for use with the Ashton-Tate/Microsoft SQL Server, allowing all PC/FOCUS facilities to be used transparently with SQL Server (as well as FOCUS) databases. PC/FOCUS for OS/2, FOCUS for SQL and SQL Server itself are all available directly from Information Builders.

A complete FOCUS system with SQL Server re quires a Microsoft LAN Manager-compatible local area network, such as 3Com 3+ Open from 3Com Corporation, Ungermann-Bass Net/One LAN Manager or IBM LAN Server.

Contact Information Builders Inc., 1250 Broadway, New York, NY 10001; (212) 736-4433.

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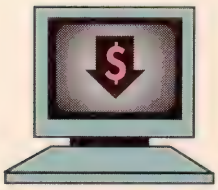

HP Systems Establish Trend-Setting Price/Performance

Focus On PC-Based File Servers Signals Major Change In Midrange Strategy

According to a report released by the Sierra Group, Hewlett-Packard's midrange strategy is undergoing a significant evolution as the company embraces PC-based networked systems as preferred office solutions.

HP's entire product strategy is rooted firmly in the client/server model where PC users interact with remote file servers to share resources and offload certain computing tasks. In its future computing scenario, HP's forthcoming LAN Manager-based products and NewWave environment/ user interface also will play major roles.

The net result of HP's new midrange strategy is per-user costs that are significantly less expensive than the solutions recommended by the company in 1988. Compared to the HP 3000 solutions recommended last year, savings range from 31.6 percent in the 16-user configuration to 51.7 percent savings for 100 users. In the four-user category, a Vectra-based file server solution is half the price of last year's minicomputer alternative.

The Sierra Group (Tempe, AZ) also indicates that the new HP 3000 systems offer better price/performance in 1989. In the 1989 study, HP recommended its HP 3000 MicroGX in place of the HP 3000 models 52 and 70 it recommended in 1988. This resulted in an average savings of 23 percent in one year.

Also significant are changes in HP's software maintenance strategies that will lower costs for users. In 1988, Sierra Group bashed HP for having software support policies that "nickeled-and-dimed" its users to death. But in the past year, HP has taken this issue to heart and has revamped its pricing policies so they make more sense in a distributed environment. The report cites HP's decision to offer PC-based software that is supported through a single CPU-related charge as intrinsic to its new pricing strategies.

The report concludes that Hewlett-Packard may well be the "...dark horse of the 1990's," and a supplier that could emerge as a powerhouse in distributed systems. One reason is Hewlett-Packard's new role and growing presence as a catalyst for industry standards and its work in developing NewWave, one of the industry's most innovative common user interfaces.

U.S. Navy Buys Multimillion Dollar OA System

HP To Install System At Puget Sound Naval Shipyard

The U.S. Navy has signed an agreement to buy Hewlett-Packard computers, peripherals and software for use in an integrated office-automation system valued at nearly $10 million.

The five-year contract calls for HP to install and provide training for the office-automation system at the Puget Sound Naval Shipyard (Bremerton, WA).

During the first phase, the shipyard will receive an HP 3000 Model 950 Precision Architecture (HP-PA) minicomputer, 10 HP Vectra RS/20 PCs and 150 Vectra ES PCs. The balance, 20 Vectra RS/20 PCs and 550 Vectra ES PCs, will be installed at the shipyard during the next three to four years.

PC-EDIT/1000

EDIT/1000 on Your PC

Now the best editor on the HP/1000 is available on your PC. PC-EDIT/1000 is an implementation of Hewlett-Packard's Edit/1000 for MS-DOS users.

PC-EDIT/1000 is designed for the computer user who works on both personal computers and Hewlett-Packard's HP1000 Computer System.

PC-EDIT/1000 takes advantage of the capabilities of the personal computer providing features currently not available on HP's EDIT/1000.

PWM

PAUL W. MILLER, INC.
27 Rambling Brook Drive
Holmdel, New Jersey 07733
201-946-0440

PC-EDIT/1000 provides the features that HP EDIT/1000 users have come to expect: Screen and line modes, interactive and batch, powerful character string search and replacement commands are all available. The command stack window gives the user access to the last 20 commands and the UNDO command reverses the last line mode command executed.

PC-EDIT/1000 also provides the user with new features: Left and right scrolling in screen mode, automatic screen and line mode tab compensation, and screen mode brackets that can not be over-written.

PC-EDIT/1000 runs on PC-DOS or MS-DOS version 3.2 or greater. PC-EDIT/1000 requires 512K bytes of RAM and a hard disk or two floppies.

Single copy price of only $295. Available on both 3.5 inch and 5.25 inch media.

CIRCLE 122 ON READER CARD

HP's Plays Role In Object Management Group

NewWave To Serve As Example For Future Technologies

The Object Management Group was formed in April 1989 to promote standards for object management technology across multiple platforms. The group started as the NewWave Consortium and to date, HP's NewWave is the only object management technology supported by OMG.

Because HP is a technology provider, the company is assured a seat on OMG's board. In the future, OMG plans to use NewWave as a working example for deriving future object management and application program interface technologies.

In August, Data General Corp., a founding member of OMG, became the first major platform vendor to license the NewWave software environment from HP. Data General plans to offer an original equipment manufacturer (OEM) version of NewWave in its office automation product line.

OMG formed a Technology Committee whose charter is to promote the standardization of object-oriented products and technologies.

Thirteen new members joined OMG in August for a total of 31 members. For corporate members, OMG membership rates are based on the companies' revenues. In addition to corporate memberships, there is an associate membership rate of $500 for an individual and $1,000 for an association. *—Peggy King, West Coast Editor*

Hewlett-Packard, InterBase Offer DBMS Software

Available For Series 10000 Personal Supercomputers, Series 3500, 4500 Personal Workstations

Hewlett-Packard, through its Apollo Division, announced it has increased its suite of database-management system (DBMS) solutions through a marketing agreement with InterBase Software Corp.

InterBase software now is available on Apollo Series 10000 personal supercomputers and Apollo Series 3500 and 4500 personal workstations.

InterBase is a transaction-based relational DBMS that includes a complete set of database utilities and program-development tools. Designed for embedded use by system builders and developers of applications with complex dynamic data and environments, InterBase provides multiple database-transaction capabilities.

The InterBase database solves the challenges inherent in online complex processing (OLCP) applications.

Simmonds Precision Contracts IISI To Support PMS

Specializes In HP 3000 Applications

Innovative Information Systems Inc. (IISI) has been contracted by Simmonds Precision, a division of Her cules, to provide modifications and implementation support for Western Data Systems PMS.

IISI is a full service systems integration/consulting firm specializing in the HP 3000 commercial applications including MPE, MPE-XL, HP-UX and associated third-party products.

IISI was selected for its experience integrating "off the shelf" manufacturing systems to meet the needs of the individual manufacturing environment and for its expertise in systems development and integration in the HP 3000 arena.

Contact Innovative Information Systems Inc., 63 Nahatan St., Norwood, MA 02062; (617) 769-7511.

Circle 397 on reader card

New Agreement Supports FDDI Standard

Parts Will Reduce Costs, Simplify Designs

Hewlett-Packard, Siemens and AT&T announced the first international multi-sourcing agreement for completely interchangeable optical transceivers that are in full compliance with the Fiber Distributed Data Interface (FDDI) Physical Media Dependent (PMD) standard.

The goal of the agreement is to supply, on an international basis, pin-for-pin compatible optical transceivers supporting the FDDI standard, including logic interface and integral duplex fiber-optic connector receptable, and having the same package outline, footprint and power supply voltage requirements. These optical transceivers allow digital electronic systems equipment, such as computers, to communicate with each other by light over optical fibers.

Until recently, manufacturers of network hardware had to select proprietary optical devices from a single source, making vendor changes costly and time consuming. The transceivers covered by this agreement are completely interchangeable, giving manufacturers multiple sources for components on an international basis. In addition, these transceivers will directly accept the FDDI Media Interface Connector (MIC) available from a var-iety of manufacturers and also will interface directly to a number of commercially available, or soon-to-be available, FDDI chip sets implementing the higher-level Physical Layer (PHY) of the FDDI network protocol. Designed for high-performance local area networks, the FDDI standard specifies a high-speed data transmission rate of 100 MB per second and above.

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NEW PRODUCTS

New Scalable Typefaces Offered For LaserJet

Hewlett-Packard has announced the availability of 12 more scalable typeface products for use on most HP LaserJet printers with the HP Type Director font-management program.

The new typefaces are CG Triumvirate, ITC Avant Garde Gothic, ITC Lubalin Graph, ITC Souvenir, Futura II, Microstyle, CG Century Schoolbook, Univers Condensed, Garamond Antiqua, ITC Benguiat, ITC Bookman and ITC Zapf Dingbats.

Each typeface product is $195 and contains both 5 1/4-inch and 3 1/2- inch discs. All but ITC ZapfDingbats come in four treatments — regular, bold, italic and bold italic. ITC Zapf Dingbats is a collection of symbols, pictures and icons and comes in five sets — Series 100, 200, 300, Ventura and PS.

PowerStation Added To GrowthPower Line

Computer Solutions Inc. (Burlington, MA) has introduced the new GrowthPower PowerStation as an add-on product to the company's GrowthPower product line.

PowerStation is a PC–based productivity software product designed for use with the HP 3000 line of computers and the HP IMAGE database. PowerStation provides managers with relational access to information in the Growth-Power and IMAGE databases by issuing industry-standard SQL requests directly from the PC.

PowerStation is a "point and shoot" windows environment with an intuitive graphic user interface. With one simple mouse click, data from GrowthPower may be downloaded to a PC-based reporting and analysis tool. PowerStation also provides over 130 sample query exercises to assist the first-time user.

Contact Computer Solutions Inc., One Burlington Woods, Burlington, MA 01803; (617) 229-2200.

Circle 386 on reader card

IBI's PC/FOCUS Bundled With SQL Server

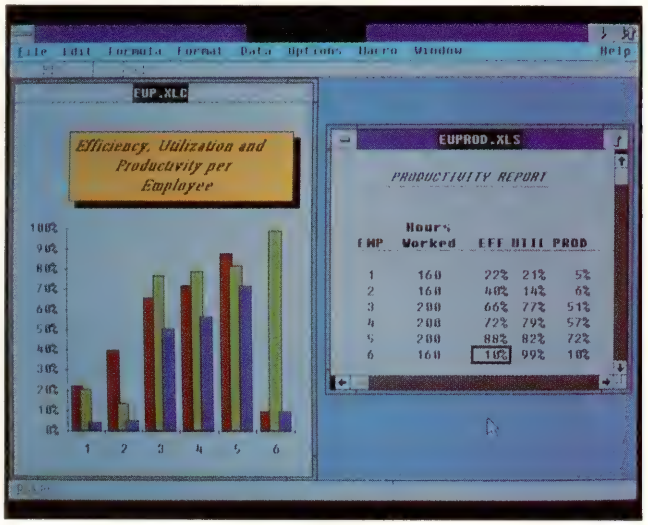
Information Builders Inc. (IBI) announced the immediate availability of The FOCUS SQL Development System, a complete four-user application development and decision support package that includes the Ashton-Tate/ Microsoft SQLServer.

The Development System, priced at $3,495, consists of SQL Server itself, the four-user FOCUS SQL Server Interface, and a single copy of PC/FOCUS for OS/2 release 3.1a. A Network License Agreement allows you to duplicate the PC/FOCUS front end software on four network CPUs.

The FOCUS SQL Development System offers report writing, application development, business graphics and communications facilities identical to and compatible with FOCUS systems for mainframe, UNIX, VAX, Hewlett-Packard, Tandem, Wang, DOS and LAN environments. The product fully supports the expanded memory and multitasking capabilities of the OS/2 operating system.

Contact Information Builders Inc., 1250 Broadway, New York, NY 10001; (212) 736-4433.

Circle 394 on reader card



Computer Solutions introduces GrowthPower PowerStation.

Carolian Systems Releases GALCON A.04.00 For HP 3000

Carolian Systems International Inc. has released version A.04.00 of GALCON, a data center management tool for HP 3000s. This latest version is compatible with both the MPE operating system of the classic 3000 and the XL operating system of the HP-PA 3000 series.

GALCON gives you the power to monitor and control system activity on any HP 3000 from one central machine. You can examine operational messages, and issue and respond to the console commands from any system, making it easy to efficiently manage all your HP 3000s. This latest version gives users the ability to monitor and control remote systems whether you are MPE V or XL-based, thereby allowing centralization and automation of HP 3000 operations. Prices begin at $25,000 and are based on number of machines.

Contact Carolian Systems International Inc., 3397 American Drive, #5, Mississauga, Ontario, L4V 1T8, Canada; (800) 263-8787.

Circle 388 on reader card

Innovous Expands Software Migration To Include MPE/XL

With the recent addition of the HP 3000 Series 925LX, Innovous Inc. now is equiped to provide software migration services for the full range of HP minicomputers and worktations including the HP 3000 Classic under MPE V opeerating system, the HP-PA version under MPE/XL as well as the HP 9000 Series 500, 300 and 800 workstations under HP-UX.

Contact Innovous Inc., 204-200 James St. South, Hamilton, Ontario, Canada, L8P 3A9; (416) 529-8117.

Circle 377 on reader card

Koch Software Releases Print Burst 1.1

Koch Software has announced the release 1.1 of Print Burst software. In this release, the IBM Color printer support has been added to the product. Any software package that allowed you to print to the IBM ColorJet printer now also can print on the HP PaintJet printer.

Print Burst is a printer emulator and utility program that serves as a bridge between IBM 5182 Color, IBM 5152 Graphics, Epson FX-80 and IBM ColorJet printers and the Hewlett-Packard PaintJet printer. Software applications that will benefit because of this added functionality are spreadsheets, graphics software and work processors — most notably IBM's DisplayWrite 4.

Print Burst system requires an IBM PC, AT, XT, PS/2, or compatible running under MS-DOS (version 2.1 or greater). You must have at least 64K or available memory, one 5 1/4-inch double-sided, floppy disc drive and an HP PaintJet printer.

Contact Koch Software Industries, 11 West College Dr., Building G, Arlington Heights, IL 60004; (312) 398-5440.

Circle 379 on reader card

Now HP-UX Supports OSF/MOTIF, Disc Mirroring

Hewlett-Packard has introduced a new version of the HP-UX operating system that includes the Open Software Foundation (OSF) Motif windowing environment as the user interface.

Other enhancements supported by HP-UX Version 7.0 include disc-mirroring capabilities to increase the amount of time the system is available, compliance with the IEEE Posix standard, and an increased level of system security.

HP-UX 7.0 will be available with the HP 9000 Series 300 and Series 800 workstations and multiuser mini-computers.

The OSF/Motif environment, which includes technology developed by HP, will be the underlying user interface for the future HP NewWave on HP-UX. The OSF/Motif environment looks and behaves the same as Presentation Manager on OS/2 and Microsoft Windows on MS-DOS, but uses a special shading technique to make buttons and scroll bars on the screen appear to be three-dimensional.

By choosing the Motif environment as the standard for HP-UX, HP will be able to offer users a similar way of working with HP NewWave when it is available across DOS, OS/2 and HP-UX, so users can switch from one system to another without extra training.

Koch's Print Burst is a printer emulator designed to solve compatibility problems between application software and color printers.

Automatix Software Available On Apollo Workstations

Hewlett-Packard, through its Apollo Division, and Automatix Inc. has announced that the full line of Automatix computer-aided (CAD) 3-D mechanical design and 2-D drafting software now is available on Apollo's Series 3000, Series 3500 and Series 4500 personal workstations.

The Automatix products, targeted for the factory floor and mechanical design markets, include: AX-1000 View and Edit, which allows for the manipulation of CAD and computer-aided manufacturing (CAM) databases, generates manufacturing drawings and allows for red-lining; AX-2000 Detailing and Assembly, which provides complete 2-D or 3-D drafting capabilities; AX-3000 Design and Layout, which allows for full-functioned CAD, 3-D wire frame, design and analysis; and AX-4000 Surface Modeling, which provides 2-D and 3-D design, analysis and modeling.

Electronic Mail Available For UNIX Systems

Hewlett-Packard has released its first electronic mail product for a UNIX operating system and three personal computer products that make it easier for people to communicate and share information with other computer users.

HP OpenMail is a multiuser system software that runs on HP-UX computer systems and in the future on UNIX systems from other vendors.

The four new HP products are HP OpenMail, an electronic mail system based on the X.400 standard; HP Advancemail III, an enhanced version of HP's PC-based electronic mail program; and two terminal emulation and file-transfer programs.

HP AdvanceLink for Macintosh provides a

way to use Macintosh computers as terminals to HP minicomputers. HP AdvanceLink for windows offers the same capabilities for MS-DOS-based PCs using the Microsoft Windows graphical user interface.

Quadratron Ships MS-DOS OA Products

Quadratron Systems Inc. has announced the MS-DOS/PC-DOS-based version of its UNIX-based office automation series. The product is file and keystroke compatible with the UNIX/Xenix versions.

Both the PC product and the UNIX/Xenix product can be installed on local and wide area networks.

Contact Quadratron Systems Inc., 141 Triunfo Canyon Road, Westlake Village, CA 91361; (805) 494-1158.

Circle 391 on reader card

Suncoast Systems Introduces COMPUTERFONE

Suncoast System Inc. has announced COMPUTERFONE, a commercial quality, two-way telephone-to-computer voice digitizer and phone control product.

This product is able to accept, digitize, store and transfer incoming speech; dial phone numbers; answer incoming calls and convert incoming tones to standard ASCII characters for processing. Other capabilities of this multifunction modem-size device include operator notification, external switch recognition and remote contact closing.

COMPUTERFONE, priced at $695, can operate with any type of operating system or computer using the RS- 232/ASCII protocol. Contact Suncoast Systems Inc., P.O. Box 7105, Pensacola, FL 32514; (904) 478-6477.

Circle 368 on reader card

RTE Offers Optical Disc File Manager For Apollo Users

Real Time Enterprises Inc. (RTE) introduced Optical Disk File Manager (ODFM) 525, a 5 1/4-inch laser optical storage system for Apollo users. The system utilizes the Laser Magnetic Storage International (LMS) 5 1/4-inch optical disc drive for non-erasable media offering 650 MB of storage per double-sided media.

The ODFM product family provides high quality, laser optical storage for Apollo Computers by using mountable optical drives. The ODFM offers the Apollo user transparent access to existing application programs. Support is available for the entire Apollo family; Series 3000, Series 3500, Series 4500 and Series 10000.

The LMS optical drive is a mid-size storage solution for many applications including technical publications, imaging systems, audit trails, EDA, CAD/CAM and backup. The ODFM 525 supports random access to all Apollo file types, utilizing either IO streams or mapping applications.

Price is $5,940 for a single-drive system.

Contact Real Time Enterprises Inc., 16 Tobey Village Office Park, Pittsford, NY 14534; (716) 383-1290.

Circle 387 on reader card

U-Tron Announces Compact Discless LANstations

U-Tron Inc. has announced Purple Series high-performance 80286- and 80386-based compact discless LANstations. It includes three 80286-based, one 80386SX-based and two 80386-based models. Each comes with 1 MB RAM (expandable to 8 MB), an ARCnet or Ethernet network card, video card (MGA, EGA or VGA) and remote boot ROM.

The LANstations offer a cost-effective way to add nodes to an existing local area network. They can support a math coprocessor chip. Each includes built-in serial and parallel ports. Features include page/interleave, shadow RAM for BIOS and video BIOS, on-board battery for CMOS settings and zero-wait state system throughput.

Purple Series discless LANstations are available from $1,495 to $3,295. Companion monitors, keyboards, LAN software and a 16-bit Ethernet card also are available from U-Tron.

Contact U-Tron Inc., 243 Charcot Ave., San Jose, CA 95131; (408) 943-1920.

Circle 367 on reader car

ALLTOOL V.1.50 Standardizes Routine Operations

Management Consulting Group has announced ALLTOOL Version 1.50, a fully integrated utility system for the HP 3000.

ALLTOOL V.1.50 was developed to simplify and standardize routinely performed resource management operations. These functions, which are presented as an MPE command extension, are available to the ALLTOOL user with the HP environment.

Some features include the ability to change IMAGE data set capacities, repack detail data sets, correct broken chains, copy databases and report IMAGE database locks, file pointers and users.

Contact Management Consulting Group Inc., 637 Wyckoff Ave., Wyckoff, NJ 07481; (201) 891-4949.

Circle 369 on reader card

The HP 700/X terminals comprise a comprehensive family of color and monochrome networked-based graphics terminals.

HP Introduces X Window Terminal

Hewlett-Packard has introduced the HP 700/X family of X Window System graphics terminals featuring a comprehensive set of color and monochrome network-based graphics terminals based on the industry-standard X Window System from MIT.

Available for nearly half the price of an HP discless workstation, the HP 700/X terminals reduce the overall cost-per-user-seat when configured as components of a total system solution.

The HP 700/X terminals are designed to operate in multivendor networked environments and provide equivalent graphics and LAN performance of an entry-level workstation configured as an X-server.

The terminals are positioned as a complementary low-end extension to the HP/Apollo workstation family, and high-end addition to the HP 700 Series family of ASCII terminals. *Continued on page 86.*

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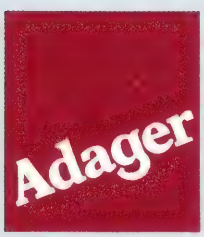

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*Naturally, Adager handles (as a matter of course) the versions called TurboImage and TurboImage/XL.

CIRCLE 102 ON READER CARD

A Print File In Every Pot

Sharing Printers In A Multivendor Environment

[BY JOHN ENCK]

Ask a programmer about printing and he'll tell you about character codes and carriage controls and the difference between WRITE BEFORE and WRITE AFTER output constructs. Ask a technical writer about printing and he'll tell you about fonts and typefaces and character enhancements. Ask an electronic artist about printing and he'll tell you about dots-per-inch (dpi), gray scaling and vector versus bit-mapped graphics.

In a single-vendor environment, this nightmare of variety is constrained by the number and types of printers supported by that vendor. For example, it's fairly unusual to find an HP shop with an IBM 3287 workstation printer next to a ThinkJet, or a DEC LP29 line printer next to an HP 2567B. Applying these same considerations to a multivendor arena, however, is like letting Freddie Krueger expand his Elm Street operation. It becomes a nightmare without boundaries.

Aside from the variety of output, the total amount of printed output is, in many environments, significant. For example, a 20-MB disc drive is approximately equal to 5,000 sheets of printed paper (at 4,125 characters per page), which is only 10 reams of paper. Remembering that a disc drive should last about five years, it isn't difficult to see how output can overshadow storage.

Most people just don't consider their print capacity because print is a disposable media. Nonetheless, this demand for output in a variety of formats brings three important facts to light:

- The demand is real.
- The individual needs are diverse.
- An individual's needs and the capabilities of any given printer don't necessarily match.

Implementing the efficient flow of printed information in a multivendor environment

involves juggling these factors with the data communications issues to create optimum relationships of users to resources, and of job submissions to job completions.

IN AN IDEAL world where things cost what we think they should, the simple solution would be to give each person his own printer. And although it is true that low-end dot-matrix printers are almost a dime a dozen, the quality of output is barely suitable for letters to mom.

Furthermore, the expense of a printer isn't limited to the printer hardware and supplies alone. Although it's technically feasible to hook a printer up to a terminal, the common implementation is to connect it to the host on a separate asynchronous line. This cascading cost of the HP host port, the increased network traffic, the queuing overhead and space all become significant factors when dealing with a large number of printers.

This train of thought inevitably leads to printer sharing. Because populating the user world with inexpensive printers is impractical, one or more high-end printers often are selected, based on weighted needs for system, draft, quality and graphics output. Additionally, a user's physical access to the final output must be taken into consideration.

An exception to these guidelines often arises when the printed data involves personnel, payroll or company confidential material. These cases dictate that the output device must be kept in a secure area. In computer shops that have "traditional" computer rooms, this output is invariably handled in that secure environment to maintain a reasonable level of control. In environments where no single secure area exists, the need for individual output devices may be justified solely on the basis of security.

You Can't Print There From Here

FOR OUR PURPOSES HERE, print output can be roughly grouped into four separate classes: simple text, dot-matrix, cartridge (non-PostScript) laser and PostScript. The importance of matching an output file with a compatible output device should be (or become) apparent.

In a single-vendor environment, this match-up is rarely of concern or consideration because the software is normally configured to use the correct printer for output. In multivendor environments, however, where printers are to be shared among different computer types, forwarding the correct output to a compatible printer gets complex quickly.

To begin with, the two types of equipment may have fundamental differences in the representation of characters, as is the case between HP and IBM. HP uses the ASCII coding standard for character representation while IBM uses the EBCDIC standard. The ability to translate back and forth between these two standards is critical if print resources will be shared.

Once the fundamental character representation is handled, a mechanism for transporting the output files between the two vendors must be identified. In order to make this selection, two key conceptual questions must be answered:

- What varieties of print format will be transferable?
- Is the output to be transferred automatically or by the user?

The answers to these questions will play a significant role in determining what type of transport should be used.

Variety Is The Spice Of Print

THE QUESTION OF PRINT format variety defines the intelligence required to handle the data conversion between systems and printers. Simple text transfers require the minimal conversion of carriage control characters. If, on the other extreme, all possible print files are to be transferred, then the transfer tools need to be able to determine not only the type of output, but also an appropriate destination for the output so it knows what format to convert to.

Among the worst cases for print file conversions is the dot-matrix class of output. For example, compare the standard HP dot-matrix control sequences with the Epson FX-80 (perhaps the most emulated of its class) sequences. Although the text control sequences are similar in intent, they are radically different in implementation. Furthermore, the significant difference between these two types of dot-matrix printers (and IBM graphics printers fall into the same category as the Epson) is the way they handle graphics.

Under HP's philosophy, a graphic is composed of a series of horizontal lines, or rasters. When graphic data is fed to the printer, it is fed in a series of "on" (black) or "off" (white) bits, with each bit corresponding to a print dot on the horizontal line. These bits are packed into bytes (eight bits/byte) to form a complete line of graphics data (see *Figure 1*).

Epson (and IBM for that matter), on the other hand, uses the

> An alternative approach to printer sharing via print file transfers is to attack the problem at the roots by moving the source of the output.

eight bits of a graphics byte to correspond to eight vertical dots of the graphics image. Multiple bytes are sent in a stream equal to the width of the image. If, for example, an image is 24 dots wide by 80 dots, then 10 "streams" of Epson graphics data will be sent, each stream containing 24 bytes (each byte defining eight vertical dots). In contrast, an HP printer would expect 80 "streams" of graphics data, with each stream containing three bytes (each byte defining eight horizontal dots).

In both cases, using all eight bits for graphics data makes it extremely difficult to transmit graphic print data using standard data communications protocols. Somehow these bits invariably turn into carriage returns, end-of-text markers, nulls, or possibly any of the ASCII control characters. This transformation inevitably brings havoc to even the best of the non-transparent data communication protocols.

Unfortunately, the dot-matrix printers aren't alone in this category. At the higher end of the spectrum, the non-PostScript lasers share the same problem, only complicated by price and technology. Among this noble class of printers is the original HP LaserJet and its offspring, the LaserJet Series II.

The lasers in this category require consideration of the type styles and sizes available to them. With font-optional lasers, it's extremely important to match the font requirements of the output with the fonts available on the printer. Printing a document formatted for eight-point proportional font output on a laser with a 12-point, fixed-space font cartridge produces unreasonable results.

Given these considerations for dot-matrix printers and non-PostScript lasers, it's only at the opposite ends of the spectrum that we can find adequate breathing room. At the low end are system printouts and simple text files, both requiring no graphics, and both easily moved from system to system because they are so gracefully uncomplicated. Conversely, on the high end are the PostScript printers that are capable of producing extremely sophisticated output while remaining simple to interface with because they universally accept the same command file structures (see *Figure 2*).

However, because no man is an island and no printer is a workstation, the consideration of print file compatibility between any two printers isn't the only issue.

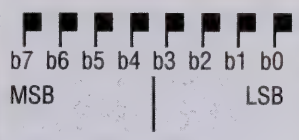
Mom, He Started It First!

REGARDING THE ISSUE OF initiation, this question addresses the human interface element. If the transfers are to be initiated manually, then the importance of the human interface is more significant then the size and performance of the product. On the other hand, for automatic transfer capability, the product must be lean and mean — able to introduce itself into the system without any negative effects on overall performance.

For example, if only simple text files are to be transported, and the transfer is to be automatic, then almost any gateway product (e.g., SNA NRJE, MRJE or the Forest Network Processor) should do the job satisfactorily. All of these products provide RJE job functions that handle printed output as part of the overall job management. In an SNA environment, they emulate the IBM 3770 RJE station, composed of multiple

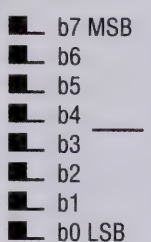
FIGURE

Raster versus "Blaster"– Bit-to-Dot Mapping



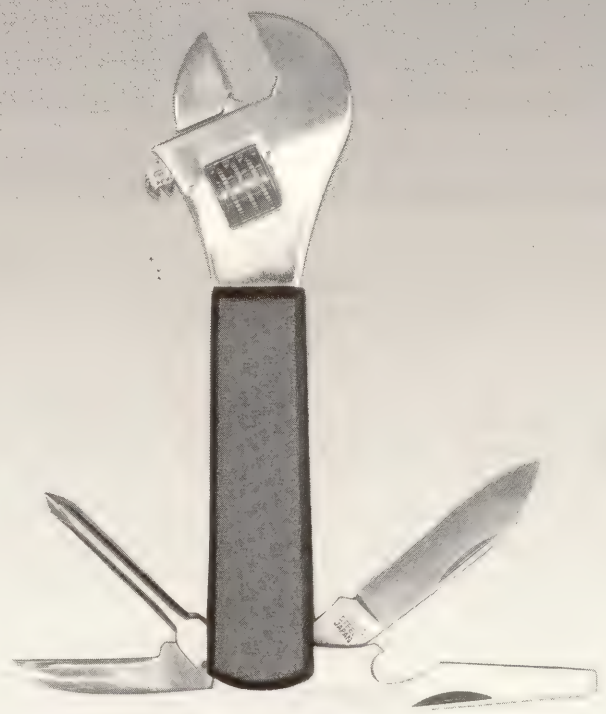
Hewlett-Packard chose to implement bit-to-dot mapping on the horizontal plane, thereby adopting the term "raster graphics." In this implementation, each bit of a byte corresponds to a horizontal pin position, with bit 7 being left-most pin and bit 0 being right-most.

Because all eight bits of a byte are used, this implementation shares the same data communication limitations as the Epson/IBM philosophy (see below).



Under the Epson/IBM graphics philosophies, each bit of a graphics byte corresponds to one of eight vertical printer dots. Given this encoding sequence, a given graphics byte can contain a value between 00 (hex) and FF (hex). This full utilization of all eight bits limits the options for transporting the data over data communications links — because all eight bits are used, either a bit-level protocol or a protocol supporting transparent (binary) data must be utilized. Furthermore, care must be taken to ensure that any interpretation of data (CR/LF mapping, tab expansion, etc.) is disabled.

TOOLS TOOLS



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CIRCLE 232 ON READER CARD

input and output devices. In a bisynchronous RJE environment, the 2780 or 3780 RJE stations are emulated.

If, on the other end of the scale, each transfer is to be initiated by the user and any variety of print output is permitted, then the choices become far more limited.

Because reality often introduces practical limitations to such complex problems, many compromises can be found. Using XModem or Kermit file transfer from system to system is often acceptable, as are any of the wide variety of generalized file transfer products. These solutions do, however, tend to be isolated to more technical environments because of the absence of a friendly human interface.

Attacking The Problem At The Roots

AN ALTERNATIVE APPROACH TO printer sharing via print file transfers is to attack the problem at the roots by moving the source of the output. If the output is a letter, move the original document file; if the output is a program listing, move the source file; and if the output is a report, move the data. Once the roots of the print are moved, the print then can be generated locally for the native printers.

This is an extremely reasonable approach *if the data actually will be useful on the new machine*. Moving the source of a program, for example, is rather pointless if that program isn't going to be compiled and used on the target computer. Similarly, moving a database and/or a set of application programs is a non-trivial task that is reduced to an exercise of futility if that data is not going to be maintained on the new host.

Moving source documents and graphics files presents a different set of problems. Because each word processor or graphics program stores information in a special format, moving the data also requires a program on the new host that understands that same format. As previously mentioned, graphics are particularly more sensitive to this issue because, unlike word processing, there is a lack of format conversion tools.

So, in most cases, moving the source is not a good solution because moving the originating data can be as complex as moving the print files. But, as with all rules, there are exceptions to everything.

The Bottom (Print) Line

ALL PROBLEMS HAVE SOLUTIONS. Sometimes the solution causes bigger problems, but that's another story. What follows are some practical solutions to the problem of printing in a multivendor environment.

■ *A Hardware Solution* — The low-end solution for print sharing lies in hardware boxes that perform printer sharing, either by sharing multiple printers for one host, or sharing one printer between multiple hosts.

Using such a device to share printers between hosts may be economical in low-volume output environments but may be impractical if the printer mix is high. For example, although sharing one printer between two hosts is a simple, straightforward and practical solution, sharing two dissimilar printers on one host port has virtually no purpose.

■ *A Software Solution* — An interesting home-grown solution is to imbed "universal" control characters into text streams to signify the beginning and end of character enhancements. *Table 1* shows some example universal codes and corresponding printer values. These text streams are then run through print filters as appropriate for the actual output destination.

More specifically, print files are written by the application using these universal codes. When a print file is then routed to a specific printer, the

FIGURE 2

Raster versus PostScript – A Simple Line

Raster Graphics Line Draw Sequence

```
<Escape>*b<#>W<graphic data>
```

Each byte of the graphic data corresponds to eight horizontal pin positions (8 bits/byte).

The "#" is the number of bytes being transfered

A trigger sequence initiates a raster graphics transfer. Separate sequences to start and end graphics mode must be sent before and after a series of raster graphics transfers.

PostScript Line Draw Sequence

```
<x points><y points>rlineto
```

In Page Description Languages, such as PostScript, commands are sent to the printer to control the operation. In this example, the draw relative line to (rlineto) command is used to draw a line from the current relative position to another point defined by the X and Y values. For example, the command "72 0 rlineto" would draw a horizontal line between the current position and a point 72 units (points) to the right. These commands are grouped into a text file to create a complete page description.

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CIRCLE 140 ON READER CARD

> Two hurdles stand in the path of this type of universal acceptance for PDL printers. Their names are Speed and Price.

spooler (or filter) for that printer translates the universal codes into the appropriate sequences for the destination printer.

Although this is an excellent application solution because it neatly addresses report and form-oriented output on all printers, it has several limitations:

-Graphics support would be difficult (although not impossible) to implement.

-Because off-the-shelf software would not necessarily conform to the "universal" standard, it leaves the documentation and graphics department out on a limb because their dependency on third-party software is so strong.

■ *An Off-The-Shelf Solution* — As noted, gateways and emulation packages certainly will handle the movement and conversion of system printouts between dissimilar systems. If these products also include binary file transfers, they also provide an often efficient mechanism for moving all types of print files between systems.

The limitation to this solution is that is does not address dot-matrix or non-PostScript laser output. In these cases, although the actual print file can be transferred, it is of little, if any, value on the opposite system. Still, these types of products provide an excellent transport mechanism that may be used in conjunction with other solutions listed here.

■ *An Often Expensive Solution* — From both a technical and quality perspective, page description languages are the ideal solution. Because the command language program is stored in a simple text file, that file can be routed easily to any system for output on any PDL-compatible printer. Given the quality of output of today's PostScript printers, this solution does not sacrifice quality for compatibility.

TWO HURDLES STAND IN THE PATH of this type of universal acceptance for PDL printers. Their names are Speed and Price. PDL (especially PostScript) printers are excruciatingly slow as they interpret and execute the PDL sequences. And not only are these devices slow, but they are also expensive. This means that PDL printers are unlike every other type of device in the mini/microcomputer market that emphasize price/performance. In today's "pay for speed" market, it is difficult to find acceptance for "pay to wait."

In conclusion, overstating the difficulty of print output handling is almost impossible. If nothing else, the subject serves as a platform for arguing if "the end justifies the means" (good output is worth any price) or "the means justify the end" (ease of use overrides print quality). But in the final analysis, although print sharing in a multivendor environment can be complex, it does yield very real cost benefits.

—John Enck is a marketing consultant for Forest Computer Inc., Okemos, MI.

TABLE

Universal	Meaning	HP Dot Matrix (*)	Epson/IBM (**)
ESC B +	Begin bold	ESC (s 3 B	ESC E
ESC B -	End bold	ESC (s 0 B	ESC F
ESC U +	Begin underline	ESC & d D	ESC - 1
ESC U -	End underline	ESC & d @	ESC - 0
ESC I +	Begin italics	ESC (s 1 S	ESC 4
ESC I -	End italics	ESC (s 0 S	ESC 5
ESC L +	Begin large	ESC (s 5 H	ESC W 1
ESC L -	End large	ESC (s 10 H	ESC W 0
ESC S +	Begin small	ESC (s 20 H	SI
ESC S -	End small	ESC (s 10 H	DC2

By using "universal" codes, the application is isolated from the physical printers. Spoolers and filters then serve to translate the universal codes to the sequences appropriate for the physical device.

(*) These values are for the HP RuggedWriter dot matrix printer. Because of HP's font/cartridge orientation, many of the sequences would be different for the laser and ink-jet printers.

(**) This chart lists the values for the Epson FX-80. These values happen to be identical to the IBM graphics printer for these selected cases. (The IBM graphic is extremely compatible with the Epson codes, however, it is not 100% compatible.)

Universal codes and corresponding printer values.

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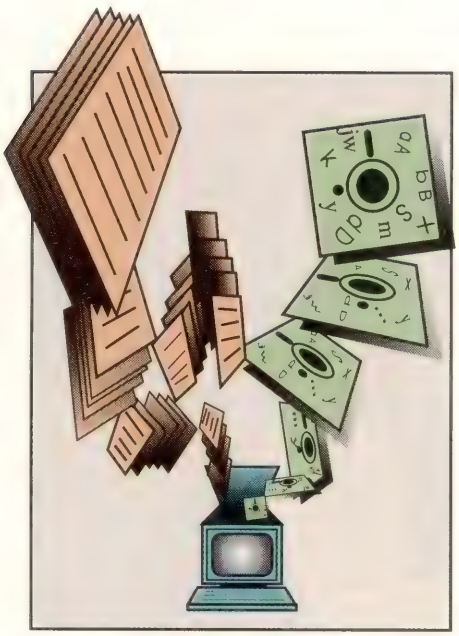

By next year, Hewlett-Packard's Apollo Division will be the center of HP's desktop publishing (DTP) activities. This means that HP's new DTP solutions will be workstation-based.

When HP acquired the Chelmsford MA-based vendor, it also acquired a marketing group focused on positioning its products as platforms for publishing.

Apollo recognized the importance of DTP when the industry was in its infancy and, for the past five years, Apollo has had a separate marketing group devoted to DTP. No such group exists within HP. Before HP acquired Apollo, the Vectra was the only platform for DTP.

Now that the HP workstation platform suddenly offers such a range of DTP software, how do you choose a publishing solution that meets your company's needs without paying for features that your users won't need? Here are some factors to consider before deciding which DTP software product to buy:

- Will the software be used the majority of the time by writers, or by engineers who will spend little time using it?
- Are the users willing to integrate third-party products with a publishing package to put together a customized system, or do they want a turnkey solution?
- What type of output devices will be used with the software?
- How structured are most of the documents that will be produced on this publishing system? Will the users be writing CALS-compliant documents?

[BY PEGGY KING]

DEDICATED DPT USERS spend most of their logged-on time writing, editing or illustrating. Dedicated users need to select workstations and peripherals that work well with the DTP software best suited to their tasks.

On the other hand, casual users, such as engineers and scientists, most likely use workstation-based DTP products because they already use workstations. They need to consider which filters and interfaces have been written for the software they already use.

Interleaf Inc. has a Partners in Publishing program. To date, about 20 CASE, CAD and EDA vendors have written filters to link their software to the TPS 4.0 publishing system on the Apollo. Similar efforts are in progress on the HP platform. Beginning with the soon-to-be-released FrameMaker 2.0, Frame Technology has a

Live Links capability that goes beyond what a filter can do. Live Links maintains a connection between imported data and the application program that created it.

Therefore, if you're a mechanical engineer using AutoCAD, you might prefer Frame because you can continue to edit your drawing within FrameMaker. If you're also using CASE products, you'd be more likely to find the filter you need from Interleaf. If you use either Cadre's or IDE's CASE tools, you get interfaces to FrameMaker as part of their products. In the current release of Software through Pictures, Framemaker's diagram editing tools are tightly integrated with the IDE product files. Diagrams from Software through Pictures can be saved as FrameMaker files.

Other Options For The Casual User

IF YOU'RE A CASUAL USER and have a low-cost workstation like the Apollo Series 2500, you aren't going to want to buy software that costs thousands of dollars to produce an occasional brochure or manual.

The Apollo platform offers two low-end publishing solutions. Through a special arrangement with Interleaf, Apollo users can pay $1,250 (or less with volume discounts) to get TPS (Technical Publishing System) Classic CORE, a subset of Core TPS. Classic Core TPS gives you most of the text processing capabilities, but without some of the snazzier features like kerning, text rotation and shaping and special pagination options.

As for graphics, there's a screen capture capability and a charting feature that offers five kinds of charts. However, you can't create books with Classic Core because it lacks the indexing and table of contents features of the more complete version. But at half the cost, you get a product that is fully compatible with the rest of Interleaf's workstation products. Look for an HP version of Classic Core to be available sometime next year.

In addition, another low-end set of products was introduced in September. Island Graphics Corp. (manufacturer of SunWrite, SunDraw and SunPaint) has announced that iWrite, iDraw and iPaint will use the OSF Motif environment on Apollo workstations. iWrite will sell for $595 and the combination of iDraw and iPaint will cost $495. These packages are scheduled to begin shipping during the first quarter of 1990.

Matching Document Types To Publishing Packages

THE BEST WAY TO ASSURE that you purchase the right publishing package is to test various product demos, especially the features you'll use the most.

The following are some general guidelines showing which products work best with certain types of documents.

FIGURE

Electronic Publishing Products for HP And Apollo Workstations

Word Processing Capabilites (Current Release)

	ArborText (Publisher 3.0)	Frame (FrameMaker 2.0)	Interleaf (TPS 4.0)
Words in spell-check dictionary	141,000	130,000	54,000
Whole word searches supported	yes	yes	no
Search and replace (case)	yes	yes	yes
Undo function	yes-multilevel	yes	no

Graphic Capabilities in Basic Configuration

	ArborTexr (Publisher 2.0)	Frame (FrameMaker 2.0)	Interleaf (TPS 4.0)
Freehand Drawing	no(avail.w/PubDraw)	yes	yes
Spline Editing	no (available with PubDraw)	yes	no (available in Full TPS)
Screen Capture and edit	capture-yes edit-no	yes	yes
Drawing Tools (for primitives)	no (available with PubDraw)	yes	yes
Clip Art	no	yes	yes
Spot color	no	yes	no (available in Full TPS)
Isometrics	no	yes	no (available in Full TPS)
Display & Edit PostScript (encap.)	display-yes edit- no	yes	yes
Photo (Contone) Editing	no	no,but available with third party pixel editors	no (available in Full TPS)

System Requirements

	ArborText (Publisher 3.0)	Frame (FrameMaker 2.0)	Interleaf (TPS 4.0)
RAM Required	8 MB (HP or Apollo)	8 MB RAM (Apollo or HP)	8 MB Core TPS 6 MB Classic Core
Disc Space to Install	50 MB	16 MB	50 MB Classic Core up to 80MB Full TPS
Apollo Operating System Version	SR10.2	SR10.1	SR9.7 or above-TPS 4.0, SR10.1 or above Classic Core
HP Operating System Version Required	HP-UX 6.5	HP-UX 6.5	HP-UX 6.5

Book Publishing: Interleaf has the most sophisticated book features, but you pay extra for them. If you need revision pages for CALS-compliant documents and the ability to see an instant overview of an entire document, you can buy Looseleaf, the module containing these features, for $9,000. For $2,500 you can purchase Book Catalogs, a subset of Looseleaf that provides for central control of style and content with a hierarchical directory and special features for managing long documents.

It's also possible to group books to form volumes and to have a master index from which to create individual indexes for each volume.

If your group is working on a single book, rather than a multivolume series, the decision about whether to go with Interleaf or another product may hinge on whether or not the book has photographs. If you decide on Frame or ArborText, you'll need to use third-party products to incorporate photographs in your text, especially if the photos need cropping.

If photographs aren't used, any basic configuration of a DTP package (except for the low-end Classic Core or iWrite) will let you produce footnotes, an index and a table of contents. The Publisher even has a feature for automatic generation of bibliographies.

Magazines, Advertising Copy, Posters, Annual Reports and Sales Brochures: The glossier the publication, the more you need the Advanced Graphics features of Interleaf. You'll want to create logos and other illustrations, incorporate pho-

[DTP Vs. Electronic Publishing]

The advent of desktop publishing over the past three years and an enthusiastic reception to it by organizations has spurred the requirement for more widespread access to information, other individuals and other systems.

Electronic publishing puts organizations in control of some of their publishing requirements, in addition to reducing costs, while increasing the efficiency and quality of producing documents.

Distinguished from desktop publishing, enterprise-wide electronic publishing includes networked computer systems and a procedural environment in which a number of people contribute to the creation of a document.

According to Mark Walter, assistant editor at Seybold Publications (Media, Pa.), enterprise-wide electronic publishing allows companies to create, produce and disseminate information across the enterprise — globally, if need be.

"As opposed to desktop publishing, enterprise-wide electronic publishing assumes a larger perspective of the organization, and the computer systems and human resources within that organization. Desktop publishing, on the other hand, connotes the use of a system within a single department, even if that includes networking within that department," he says.

Industry participants suggest that electronic publishing applications capable of producing a variety of documents including sales proposals and presentations, product and user manuals, business forms, catalogs and directories will no longer be specific to a particular desktop.

While computerized corporate publishing has been around for more than two decades, early users were dependent upon proprietary systems. Today, because of the vast changes in technology, electronic publishing systems are more broad in their product lines, spanning from the desktop to the mainframe.

"What we are seeing is a move away from proprietary systems to a more open and decentralized environment," says Bill Clinton, director of computer publishing systems at BIS CAP Intl. of Norwell, Mass. "Today's systems are more affordable and flexible."

Electronic publishing systems include a range of technologies that includes PCs, workstations, minicomputers, mainframes, storage devices, input devices such as scanners, and output devices such as printers. In the future, electronic information will include voice and animation. Print will be one option for information delivery.

The features and function of enterprise-wide electronic publishing systems include, according to Walter, networking and document management, the ability to track revisions, and the volume of the application.

According to a recent publication on electronic publishing by the National Institute of Standards and Technology, three infrastructures and services are necessary to connect, integrate and manage the different publishing pieces:

Communication systems, including both LANs and WANs for connectivity.

Database structures, such as information management systems, production management and tracking software to manage information workflow.

Document interchange formats, such as Office Document Architecture and Interchange Format and Standard Generalized Markup Language to integrate different types of information.

The Future

The plan for the future of enterprise-wide computing, says Walter, is to allow for an upgrade path and not be locked into a single vendors products.

Today, enterprise-wide electronic publishing allows users to write copy, import graphics, images and other information from other systems and applications, says Clinton. "Over the next year, however, new document-processing environments will emerge that enable greater function, office automation and DP integration, as well as better interoperability at both the inter- and intravendor platforms," he explains.

While still in its infancy, enterprise-wide electronic publishing is in a significant transition period with products emerging across platforms and computer vendors advancing on new document-processing environments — but there is still a ways to go. —*Lynn Haber*

tographs with text, shape text in free-form ways and create dramatic effects with graphic typefaces. Neither Frame nor ArborText position its product as the one to choose for unstructured, one-of-a-kind publications.

CALS-Compliant Compound Documents: The CALS specification is so recent that most electronic publishing vendors haven't yet completed their CALS products. Products based on SGML—the CALS documentation standard—have a head start. The Publisher used the SGML specification from the very beginning. By contrast, it wasn't until TPS 4.0 that Interleaf incorporated SGML around its own formatting engine, and Frame won't have SGML until it adds the XGML Engine from Software Exoterica Corp. in a future release.

Interleaf's CALS product is closest to completion. The CALS Preparedness Package (currently available) comes with training and support. The package has all the specified filters except for CGM, (computer graphics metafile). However, after you pay your $60,000, Interleaf will throw in CGM at no extra cost. Frame is further along with its CGM filter because the filter already has been put through alpha tests. ArborText promises a CALS-compliant product in a future release.

Because neither Frame nor ArborText has revealed its plans for positioning and pricing its CALS products, it's too soon to know which products will work best for government contractors.

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[Selecting The Right Printer]

You no longer have to choose between PostScript and the rapidly vanishing ImPress printer interface language when you buy a printer for use with a publishing system.

Generally, PostScript printers cost about $2,000 more than printers with PCL or other printer languages. The extra dollars cover the cost of the 2 MB of extra memory that PostScript requires plus the royalty that the printer company pays to Adobe.

If you're building a system from scratch, think about whether you can get by with a LaserJet or other low-cost laser printer. If you're preparing copy to be typeset and need to do intense graphics or to rotate and scale fonts, it's best to stay with PostScript. Otherwise, a PCL printer should work just fine, especially now that both Frame and Interleaf products will have PCL drivers. If graphics aren't part of your document, The Publisher can output text to LaserJets and other non-PostScript printers.

If you need to produce documents that contain illustrations output on plotters, both Interleaf and Frame have HP-GL filters, but TPS is currently the only product with a CalComp plotter driver. If you need to use scanner output, you now can get a TIFF filter that works with TPS or with Framemaker (new to Version 2.0).

ture products that need user guides, reference manuals and installation instructions. Frame is the best bet if your company's manuals contain CAD or EDA drawings and the software you use happens to have Live Links to FrameMaker. But if there are no Live Links, filters at least provide a means of getting finished output into a document. HP engineers have written an ME10 filter for TPS. If you want to use output from a package that doesn't have filters, you may want to investigate how much effort and tinkering it would take for engineers to write their own.

If your publications department produces highly structured manuals with few illustrations, The Publisher may be your first choice. If all documents conform to a set style, it's not important to have a WYSIWYG window for editing, especially because The Publisher has a display window that shows a precise representation of the page. Another good reason to go with The Publisher is if your manual is full of tables. FrameMaker lacks a sophisticated table editor and Interleaf charges $2,000 for its tables package.

With any of the full-featured DTP packages, authors will be able to generate revision bars for draft copies of the document. In future releases, expect to see revision tracking features that work with networked systems to reveal who made what changes.

Articles for Engineering and Scientific Journals: FrameMaker is well-suited for technical and scientific articles, especially if they contain equations and formulas. With the solver feature, writers can check their math on the fly.

The Publisher also has a sophisticated equation package with 500 mathematical symbols available in eight font styles. Both products can display equations as part of the text (in-line) or in a separate display. It's also possible to incorporate results from Mathmatica from Wolfram Research in Publisher documents. With Interleaf, the equation package costs an extra $1,000 unless you have full TPS.

Newsletters: Once again, the package you choose depends on how glossy your company or group's external communications need to be. The most impressive mailers will come from the products with the most sophisticated graphics features. If the newsletter doesn't need to be a showcase item, you probably can get by with Classic Core or the iWrite/iPaint/iDraw trio from Island Graphics.

Business Forms: If the only reason you need an electronic publishing package is to produce forms, why not let your HP 3000 do the job? You'll save the expense of buying a workstation and you'll be able to use less expensive software if you invest in one of the six or so forms packages available for the HP 3000. Along with business forms software, you'll also need software to produce file equations that allow forms output to be directed to a LaserJet printer. (See "Create Your Own Forms" in the August issue for a discussion of three forms products.)

NOW THAT HP IS becoming a company that sells workstation solutions for DTP, there's plenty of pent-up demand for these products. Although it's easy to get swept away by all the new features in any vendor's latest release, avoid the temptation to buy features (or even products) you don't need. Make a list of the kind of documents your users will be producing and a list of the capabilities they need to work most effectively.

If you don't know all the answers, do what HP is doing. Interleaf and HP have worked out a deal that provides a very sizeable corporate discount to HP sites. Therefore, many employees plan to switch to TPS on HP workstations from their HP 3000-based text processing packages or Vectra-based publishing solutions.

Finally, listen to your own users before attempting to determine what product will deliver the features they need at a price you can afford.

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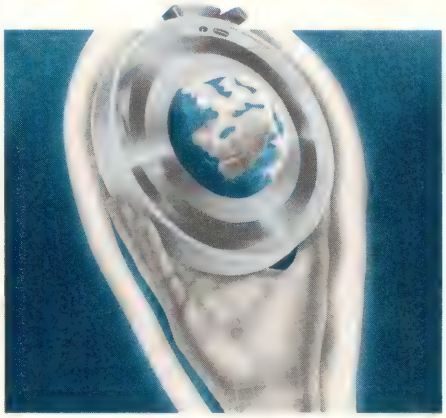

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Workstation vendors are like car salesmen of the '60s — they hawk speed. Every major manufacturer offers an array of different models with a daunting selection of options ranging in price from $4,000 to $100,000-plus. Each new system is faster than the last, and the end is nowhere in sight. These are not idle speed games, but a flat-out competition for a rapidly growing market.

Market researchers Frost & Sullivan recently reported 1988 U.S. workstation platform sales reached $4.5 billion. By 1993, they estimate platform sales in the U.S. will reach $21 billion. HP/Apollo's share of the market, reported by Dataquest to be 29 percent, works out to around $1.3 billion in platform sales for 1988, and $6 billion by 1993 if market share holds steady.

The stakes are high.

Don't Blink

Going fast is perceived to be the key to the race for your dollars. Every month or so, a new system is on top offering more millions of instructions per second (mips) than the last workstation wonder. Each winner is in turn surmounted by yet a faster system, the whole process moving at a pace that must strain profit margins and squeeze product development timelines until they hurt.

Comments here and there challenge the validity of this performance claim or that one, but the competition goes on. Each of the major vendors now offers something in the range of 20 mips, and multiple systems from 10 to 17 mips. Systems capable of 30 mips are said to be not far off.

A Profusion Of Yardsticks

Brochures, salespeople and articles talk of mips, VAXmips, Linpacks, Whetstones, Dhrystones (where are Dhampstones?) and other lesser-known benchmarks such as bison, gawk, doduc, spice, ora, wave and tomcatv, etc. What is all this?

Vendors are working hard to get a competitive advantage wherever they can, and with technology moving so quickly toward greater capability in computers, one of the more effective ways to get ahead is to "run" faster. But in order to clearly show how your system runs faster, you must have a measure.

A few years ago, with fewer vendors and systems to choose from and more time between generations of computers, the task was easier. Now, as computers are capable of effective use in a bewildering array of applications, the task of measuring the effective speed of a system in use becomes far more difficult.

System performance is in fact directly dependent upon the application software; how it is written, what parts of the computation system will work the hardest and the proportion of the computation that will be done by different parts of the computer system.

Mips, Linpacks And SPECmarks

Each benchmark measures a different part of computer performance, and each of the major workstation vendors has defined benchmarks in an effort to come up with better measures. Some vendors have at times hinted that another firms' benchmarks are intended to show its own products in the best light, but there seems to be no solid evidence to support this.

Million of instructions per second, or mips, has been a measure used for approximately 10 years. It represents the speed of the computer

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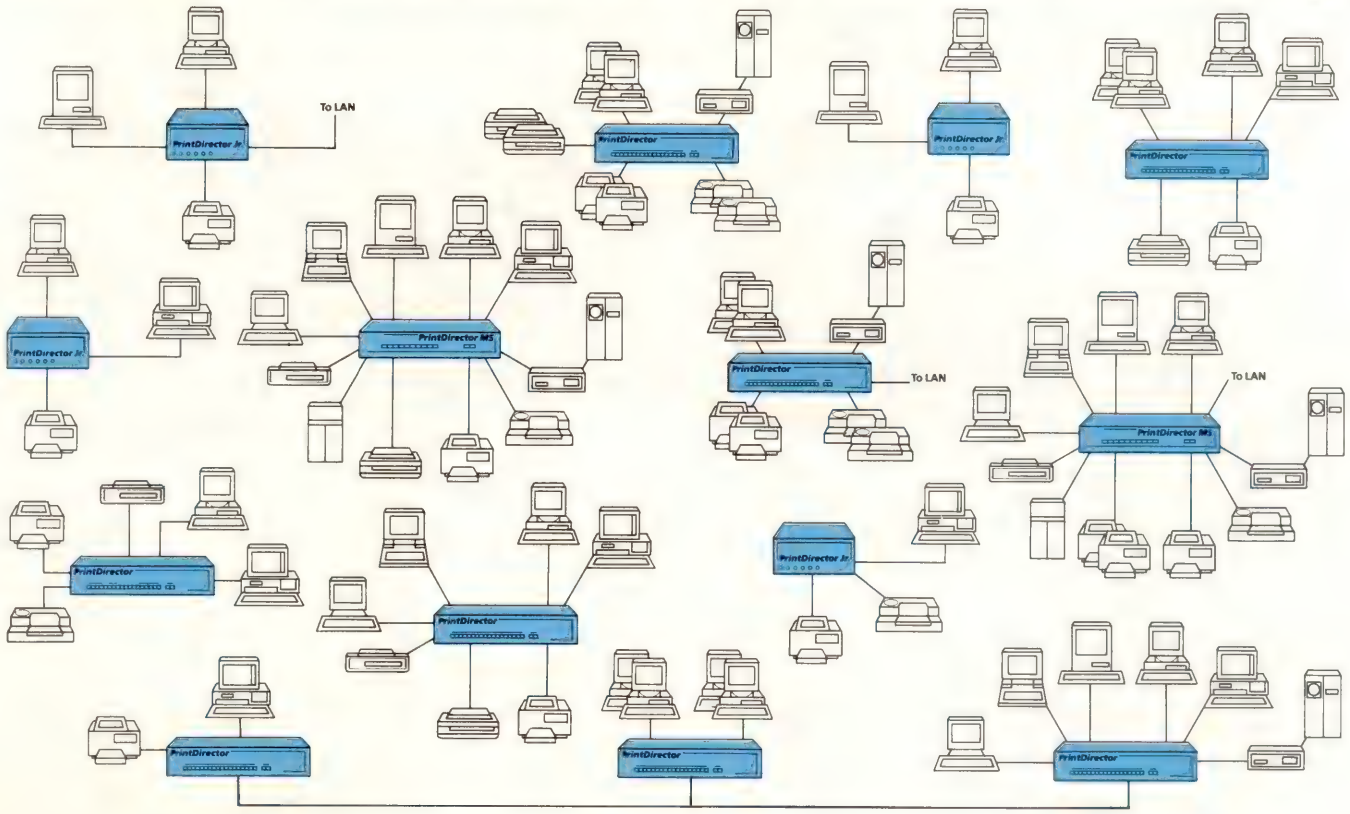

at integer performance, measured relative to a DEC VAX 11/780. (The VAX is arbitrarily assigned a value of 1 because it was a widely used and respected system.)

Linear equations package, or Linpack, is used to measure performance for scientific and engineering applications that make heavy use of floating point addition and multiplication. In *Table 1*, double-precision (DBL) Linpack numbers are given in megaflops, (MFLP) or millions of floating point operations per second.

A number of firms seeking to resolve the performance confusion formed the Systems Performance Evaluation Cooperative (SPEC) to develop more even-handed benchmarks with which to determine the performance of computing systems. SPEC member companies include Hewlett-Packard, AT&T, Control Data, Data General, Digital Equipment, Intergraph, IBM, MIPS Computer Systems, Motorola Microcomputer Division, Stardent and Sun Microsystems.

Last month SPEC announced its first benchmark suite, Release 1.0, which measures both integer and floating point performance as they relate to scientific and engineering applications. SPECmark is the geometric mean of a suite of 10 benchmarks run as part of the SPECmark test suite. SPEC doesn't test the machines itself, but provides the test suite to member companies, which then test their own machines and turn over the results to SPEC for publication.

Only a small number of SPECmark test results were available at this writing, but more will quickly be available. SPEC expects to develop further benchmark suites aimed at accurately measuring computer performance in other application areas as well. These areas will include multi-processing, file system performance and graphics.

SPEC isn't the only industry effort at getting together for more effective measurement of computer processing speeds, so further developments may be expected before solid standard measures emerge.

How Much Is Enough?

A popular dictum in the computer business has it that you can't put enough mips on somebody's desktop. But some people are beginning to wonder. Larry Gray is an R&D lab section manager in the workstation development program at HP in Fort Collins, CO. As a member of the SPEC Steering Committee and a participant in HP R&D efforts for several years, Gray finds himself less certain that more is *always* better.

"How effectively can one person use 20 or more mips?" he asks. "Our computer use studies show that, while people can make intense use of systems for brief periods of time, that high capacity is wasted most of the time." However, HP does have the Apollo division's DN10000 at 22 mips, just in case.

Gray points out that great processing speed is no guarantee that the speed of the application software on the user's

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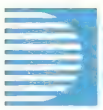

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desk will be significantly better than an apparently slower system.

"Mips and megaflops are not often an accurate indication of application performance. Benchmarks are CPU-intensive measures. They serve quite nicely for determining effectiveness in compute-intensive applications, but there are many more applications, such as designing, desktop publishing, or X-window based interfaces where processor speed is not the major determinant of application performance."

Gray notes that when workstation memory is too small the system swaps data in and out, dragging performance down. Disc access rates that are too slow for the application can make processor speed all but meaningless because the CPU may be idling away at breakneck speed, waiting for data. In discless applications, the speed of the network and its discless implementation become crucial.

HP's performance in this area is particularly noteworthy, Gray points out. "Our discless performance is virtually the same as disc-based, standalone performance."

As one of the acknowledged leaders in high-performance workstation graphics, HP knows well that a performance-tuned graphics engine is essential to graphics performance at the high end. HP's graphics engines have been a key to the company's success in this segment of the market.

"If you don't have good memory, I/O and graphics, you won't have good applications performance in all areas," Gray says. "The constant caveat is 'your mileage may vary'—it may be better or worse than another system. Benchmarks based on real-world applications would provide a better indication of real-world performance."

Relative Positioning

SPEC and other organizations will gradually work out standard methods for testing performance of graphics-intensive and other non-CPU-dependent applications, which means help is on the way. Be patient.

In the meantime, how do we sort mips from megaflops without getting unnecessarily separated from our money?

An observation from Mike Tyler of Dataquest may help. "The experts tell me that a new system needs to be about twice as fast as the previous one before the user can really tell the difference," he says. He thinks users are making purchase decisions overly influenced by CPU performance differences not great enough to make a big difference in application performance.

In the marketplace, adds Tyler, "performance seems to be the big issue." All the vendors are pumping out performance numbers as quickly as they can and developing new systems to push those numbers higher.

Tyler considers benchmarks "very

similar to mileage indicators on new cars. No one believes them, but they are helpful for relative positioning. They don't really convey much about actual performance."

On the other hand, while Tyler disputes the value of the numbers, he makes a point of saying that vendors seem to be honest in deriving them. "I recently went through the published numbers from the companies and compared them with independent tests. I don't see a big difference. Vendors are trying to provide honest, helpful numbers to buyers."

How Do I Pick One?

In a buying decision, Tyler suggests looking at performance specifications only to make the first cut. After that, mips, Linpacks and SPECS should have little to do with your choice. Other considerations are much more important.

"I wouldn't quibble about close differences at all. First, look at a whole class of machines. Take, for example all the RISC-based workstations with mips ratings from 10 to 17 and lump them together. Second, look at scalability. Can I upgrade each of these systems to the next generation of processors when it comes out? Can I port all of my software to the new machines as they are announced? Third, look at the application. Will my applications run on that new system, and will they run on future systems from the same vendor?"

First, look at a whole class of machines. Second, look at scalability. Can I upgrade each of these systems to the generation of processors when it comes out?

These are the important questions, says Tyler, and the answers could save or cost you far more than the hardware. Performance numbers just help to narrow the field.

Speed Isn't Everything

Performance is measured in many difference ways. In the workstation market, both vendors and customers have gotten used to thinking of performance in terms of raw, blinding speed—CPU speed. But performance is as much functionality as speed and as much implementation as speed. The work begun by SPEC goes a long way toward developing standard methods for impartial measures of something approaching real-world application performance. Then we will have a much more accurate picture of which platform will do the best job in each area of application—and that is performance that matters.

Would you like to continue to see articles on this topic?
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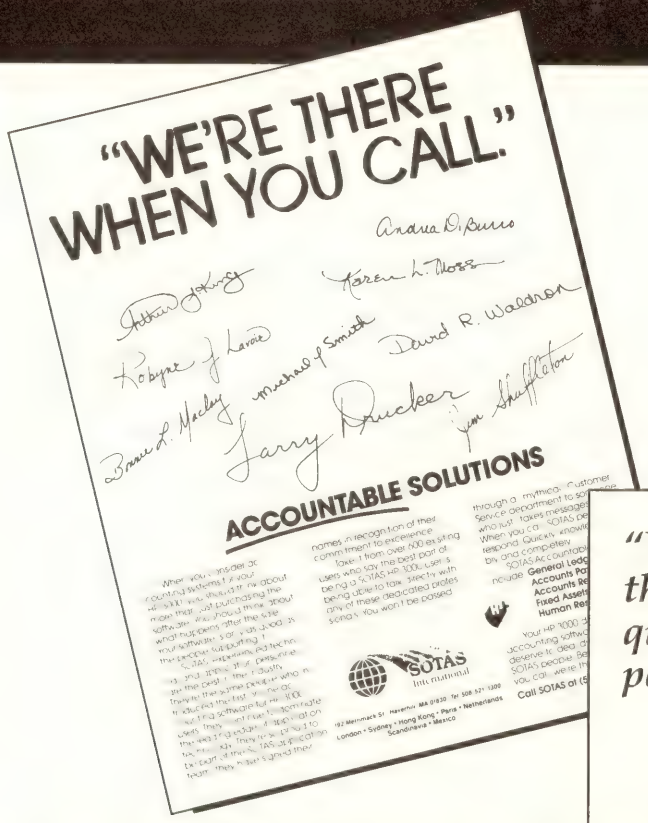
yes 336 no 335

TABLE I

VENDOR/SYSTEM	SPEED (MHz)/PROCESSOR	ENTRY PRICE	VMIPS	SPEC mark	LINP (DBL, MFLP)
HP Vectra RS25C	———	$7,349	5.0	NA	0.22
HP 9000 340	25/80386	$5,495	4.0	1.6	0.14
HP 9000 370	16.7/68030	$24,500	8.1	3.9	0.65
HP 9000 834	33/68030	$19,375*	14.8	9.5	2.02
HP/Ap DN2500	15/HPPA	$3,990	4.0	NA	0.20
HP/Ap DN3500	20/68030	$8,490	5.0	NA	0.25
HP/Ap DN4500	25/68030	$19,495	8.0	NA	0.59
HP/Ap DN10000	33/68030	$79,900	22**	14.5	5.10
Sun 3/80	18/PRISMX2	$5,995	3.0	NA	0.16
Sun SPARCst330	20/68030	$29,900*	16	11.3	2.67
Sun SPARCst 1	25/SPARC	$8,995*	10-12	8.3	1.34
DECstation 2100	20/SPARC	$7,950	10.4	7.5	NA
DECstation 3100	12.5/R2000	$11,900	14.0	10.1	1.60
MIPS M2000	16.7/R2000	$83,000	24	16.5	3.9
MIPS RS2030	25/R3000 16.7/R2000	$12,150	12	9.3	1.8

All data supplied by manufacturers and cross-checked where possible.
** All prices quoted are for base price, discless systems. It is unclear whether some systems will be supported as discless nodes, although discless prices were supplied.*
***DN 10000 mips and Linpack data based on 2-CPU system.*



"We've received a lot more responses, the leads we're getting are of a better quality and I'm very happy with the percentage we're turning over"

Art King
HP 3000 Business Manager
SOTAS International Inc.

For SOTAS, HP Profesional Means More and Better Leads

SOTAS International Inc. is a leading provider of premium accounting solutions for the HP 3000 market, with more than 650 applications installed worldwide.

What does HP Professional give SOTAS that other publications don't?

"There are a lot of little things HP Pro does to help us out," says Art King. "When you get an HP Pro lead, you get a whole sheet, with all the site demographics broken out in an easy-to-understand format. When you're trying to follow up on leads, it's nice to have that information going in."

"Because our HP Pro leads are prequalified," continues King, "we know whether the prospect should get an immediate response. HP Pro also makes follow through easier by putting blank call sheets that you can use as turnaround documents on the back of lead sheets. No one else puts together all this data and no one else provides lead sheets."

"We started with a 6 time run in HP Professional and a 12 time run in another publication, but based on the results we were getting, we flip-flopped that around. Now we're on a 12 time run with HP Pro."

Are there any other HP services SOTAS finds useful?

Art King says yes. "When we need a [direct mail] list, we just call HP Pro and say 'This is what I'm looking for in terms of a breakdown.' They come back with a very specific list and we know it's targeted directly to HP users."

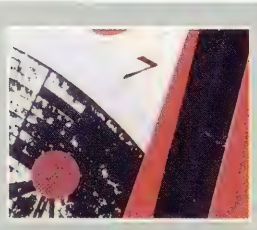
"I guess it all boils down to this. They listen. They give you a lot of personalized assistance without your having to ask."

"The most important things we've always stressed are service and attention to detail. We have an excellent relationship with HP Professional because they're oriented the same way we are. We know we can count on them for service and attention to detail."

HP Professional

A BETTER WAY TO MOVE CARGO

Using An HP System, The Virginia Port Authority Is Sailing On The Right Course



TECHNOLOGY

John S. Fusek

Editor's Note: This article is the third-place winning entry in HP Professional's Call For Paper's Contest.

Virginia International Terminals, the company that operates several ocean-going shipping terminals for the Virginia Port Authority, is a Hewlett-Packard success story. VIT's innovations have raised the ports of Virginia to second place in number of containers moved on the East Coast. HP's equipment allowed VIT's small DP shop to play a large role in this achievement.

One problem that has always plagued the shipping industry has been how to get vessels loaded and unloaded quickly.

In Norfolk, an innovative approach has been implemented. In February 1987, VIT installed two new high-speed cranes at its Norfolk multishipline container terminal. The cranes moved containerized cargo at twice the speed of older models. The old, paperwork-heavy method of moving and tracking containers around the yard was too slow and cumbersome to utilize the new cranes at maximum efficiency. This method employed work assignment cards for each container that had to be manually delivered around the yard by messenger. This required a lot of verification by the crew chief or checker before any work could be started, and demanded key entry by clerks who tried in five 12-hour days to stay current with 24-hour-a-day, seven-day-a-week movement of containers in the yard. After a weekend of activity, it sometimes took until the following Wednesday to get the computer updates in line with physical inventory.

After much analysis, it was decided to implement a computer system that would direct and record the movement of containers into and out of the main stacking area. The system had to be:

- Fast and accurate.
- Reliable enough to survive major power failures.
- Able to hold a full day's work.
- Rugged and not environmentally sensitive.
- Simple enough for day-hire labor to use.
- Have messaging capabilities.
- Interface quickly with the current container system.

In January 1988, the Yard Management System, designed at VIT, came online and resulted in a 99 percent decrease in the time needed to update container movements with much greater accuracy.

The Yard Management System

The Yard Management System (YMS) can be broken into three subsystems:

Stack Management utilizes available storage space most efficiently while allowing for rapid vessel turnaround. It's the central application and directs all the others.

Parking Location Tracking allows up-to-the-minute information on the location of cargo in temporary parking locations. This handles the positions of containers that have just come in the gate and those that are ready to depart out the gate.

Work Order Management takes the information from the previous two subsystems and, using RF handheld PC units, directs the work of day-hire labor, eliminating messengers and stacks of assignment cards. No longer does it take until Wednesday for the computer to catch up with weekend container movement.

Equipment

The Yard Management System uses a network composed of an HP 3000 Model 70, HP Vectra

PCs and Telxon 750 Radio Frequency Handheld Terminals. Each node of the system is intelligent and has storage capacity and alternate methods of transferring data. The PC provides the interface link between the HP 3000 and the handheld units. A link from the handhelds directly to the 3000 was possible, but unreliable power to the HP 3000 is a problem at VIT. To ensure 100 percent up time of the handhelds, a Vectra PC connected to a reliable power source is used as an intermediary. Also, a dedicated PC would provide the best turnaround time to field.

The Telxon 750 Radio Frequency Handheld Terminal is used by the pad workers for YMS processing of work orders and communication messages. The application consists of menu-driven, easy-to-use screens providing all the functions required for the terminals to be the sole source of communication between the office and workers. Information is transmitted to and from the 3000 YMS Application in near realtime, meaning that the information flows through the system rapidly and the database is updated as work orders are completed, but the system does not provide a truly interactive dialog between the YMS Application and the handhelds.

How The YMS Operates

When a container enters the gate, it's interchanged then sent to the temporary parking in the wheeled area. The office key enters the information on the container into the database: the container's number, its size and weight, port of discharge (destination), vessel of departure and any other information the shipping company deems important.

The shipping companies using this terminal each has its own method of operation, national and international law it must obey, coupled with problems unique to that company that must be taken into consideration when assigning container locations in the stack. Because of these problems, no other multishipline terminal in the country has its entire

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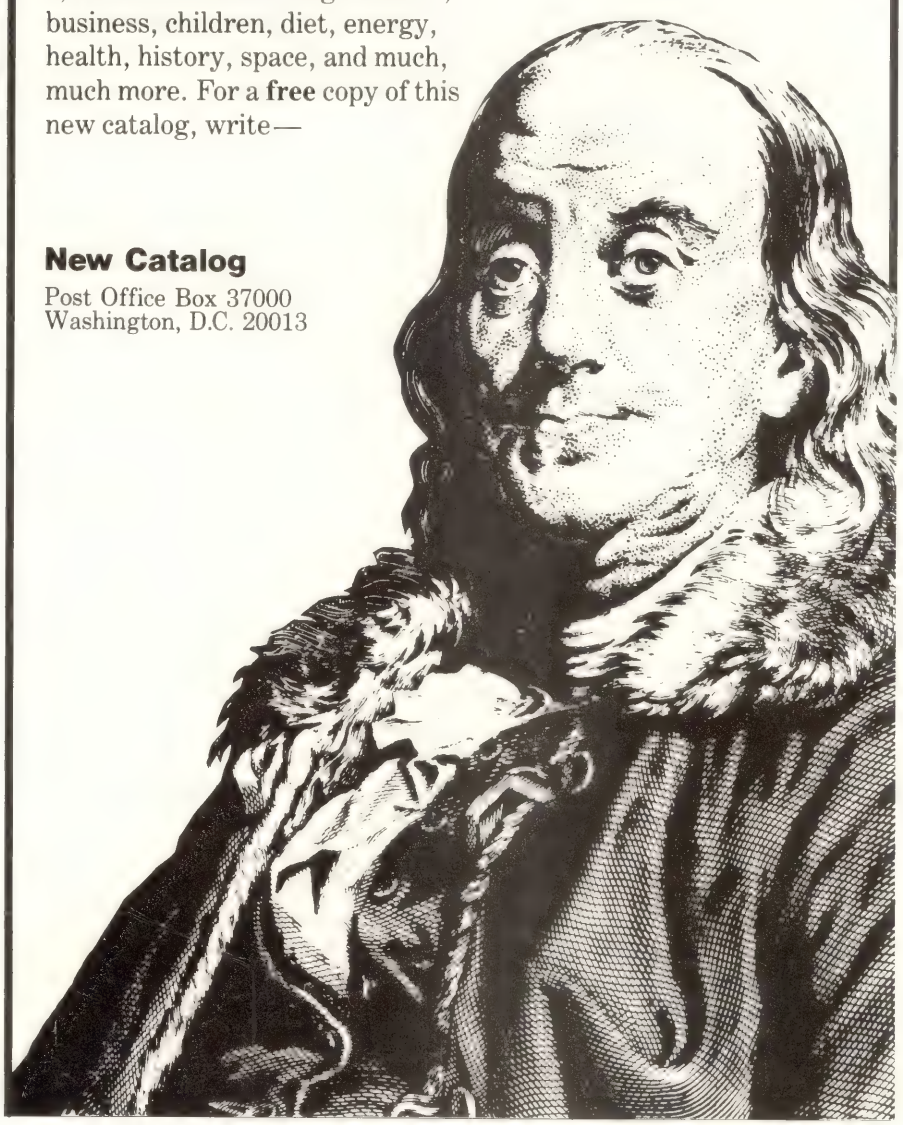

The Telxon 750 Radio Frequency Handheld Terminal unit (left) is used in Virginia International Terminal's Yard Management System to store location, size, weight and ultimate destination of each container (right).

cargo-moving and tracking system computerized.

A data entry clerk enters the container number into the system the minute it clears the gate so it can be sent out to the parking location tracking system. This eliminates the need for the location man to do anything but pick the number from a list and enter a parking location. This temporary parking position is received back into the main system at this point.

To make the most efficient use of spaces, shipping containers are removed from their chassis (the wheel portion that hooks up to the tractor) and placed one on top of the other in the stack. The goal is to get the container out of temporary parking and into the stacks as quickly as possible.

The 3000 YMS Application assigns the stack location overnight in most cases. The supervisor in charge of the yard reserves sections of the stack, called rows, for every shipline and supplies the system with the criteria that shipline is currently using to load its vessels. The system then finds the best match between row and container and allocates stacking positions. The stack and row should be ones from which the container can be removed easily when it's ready to be loaded.

These locations and any other work orders (such as those coming out of the stack and being placed on chassis) for the next day are downloaded to the PC each night. All work orders are downloaded from the PC to each handheld through a hardwire link prior to the day workers pickup the units.

Once work orders are downloaded, the workers log on, identifying their work area location, and begin the day's work moving containers to their ordered location. Because all work orders are loaded into the handheld, workers can change location during the day without reloading work orders.

As a container is moved and stacked, its new location, including stack, row and row position, is entered into the handheld terminal. Completed work orders are transmitted to the YMS throughout the day, updating the database. The office can send new work orders to a specific location any time during the day. Both workers and the office can send messages throughout the day to facilitate communication. The terminals also keep track of a work crew's status, knowing when a crew is working, on break, eating a meal or has no work to do. At the end of the day, workers return the Telxon terminals to the office. Any remaining information in the unit is transmitted to the YMS (via hardwire link) and the terminal is cleared to prepare for the next day's work order download.

If the information in the handheld is lost or corrupted, the workers can reload the terminal by initiating the download via hard link.

After a day's work is completed, the system produces various reports that show container movement during the day. Others are produced that track the productivity of the crews and their equipment down to the trucks that move the containers around.

Data Communications

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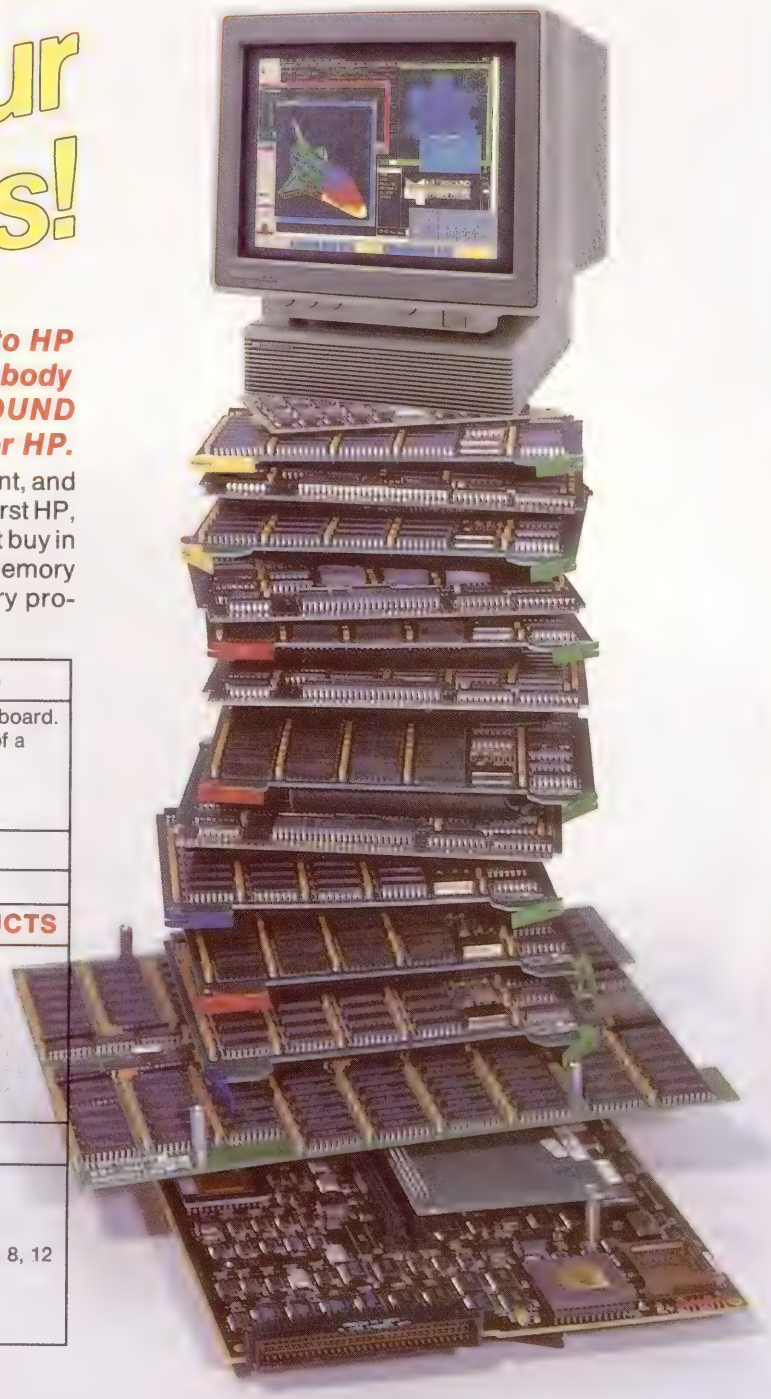

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CIRCLE 126 ON READER CARD

communicates with the PC through serial ports and the PC's interface with the HP 3000 using standard asynchronous protocols. The PCs communicate with one another using a STARlan local area network. This was chosen because of our familiarity with twisted pair wiring and low cost of equipment.

Western Digital Vianet software was the networking operating system we selected. This simplified installation of the network. We set up a peer-to- peer network with queue files to facilitate passing transactions between systems. The relative low speed of such a network is not a problem when at most a few hundred bytes of data are being passed in any given second.

The Programs

There are several major programs that make up the system. The 3000 YMS Application is the heart of the Yard Management System. It consists of a combination of online and batch programs that process the VIT work orders and communicate with the Telxon handheld terminals. It's important to note that only the 3000 YMS Application programs access the YMS database. All interface communication to the handheld terminals is accomplished via two message files. Work orders and messages transmitted from the 3000 YMS to the handhelds are placed in the HANDHELD-OUT file, and completed work orders and messages transmitted from the handhelds to the 3000 YMS are received in the HANDHELD-IN file. Message files can be configured to activate programs when data is placed in the file, so information received from the handheld terminals is processed.

The 3000 Controller provides a centralized interface link between the many 3000 YMS Application programs and the handhelds. The Controller is capable of handling multiple PC Controllers to allow for system growth. This is a nonsophisticated program with no knowledge of YMS Application logic; it simply passes information from the HANDHELD-OUT file to the PC Controller, and from the PC Controller to the HANDHELD-IN file. An audit is kept of all transactions processed and any error conditions encountered.

The PC Controller provides the interface link between the HP 3000 and the handheld terminals. The PC Controller functions could have been incorporated into the 3000 Controller, but we decided to use PCs to isolate the crews in the yard from any problems on the main HP 3000. The PC Controller is a sophisticated program functioning as an integral part of the YMS Application logic. The PC controller maintains work crew status information, and passes work orders and messages between the HP 3000 and the handhelds. In case of HP 3000 power interruption, the PC Controller will continue handheld terminal processing monitoring work crew status and storing information until the HP 3000 is ready to receive data again, and provide PC keyboard input of new work orders and messages. An audit is kept of all transactions and any error conditions encountered.

There presently are three controllers running now that communicate with each other over a LAN. One PC controller is attached to the base station directly and provides rapid response to the day-hire labor. Another is for the Parking Location Tracking subsystem and the final one manages the Work Order Management subsystem. These last two interface directly with the HP 3000. A fourth PC is used to speed downloading of work without tying up the other two and can substitute when one of the others is down. This fourth one also handles reporting in case of HP 3000 failures.

The Telxon Base interfaces with the PC Controller to provide the actual communication link to the radio frequency handheld units. This is a nonsophisticated processor with no knowledge of the YMS application logic; it simply passes information between the PC Controller and the Telxon terminals using radio transmissions.

There is also a background program that runs continuously, 24 hours a day, to receive messages and completed work orders from the handheld terminals and update work order details in the YMS Database. Database update includes updates to existing work orders and adding new work orders generated by checker moves and the PC Controller entry when the HP 3000 was unavailable.

Developing The Yard Management System

At the time the YMS was designed and its programs written, the DP shop at VIT had six or less people. The new system was designed and implemented while maintaining all existing applications in a period of two years. This was possible because of the ease of interfacing the shop's existing HP 3000 with the other necessary equipment. During the time YMS was developed, many other new systems were added to VIT's burgeoning computer system. Most of these lack the glamour of YMS, but not the complexity. These included systems for U.S. Customs interfaces, rail movements and complete dial-up customer information system.

The Yard Management System had to interface with VIT's 12-year-old Container Control System that was nearly obsolete. Halfway through the design, it became apparent that this old system could not provide location information fast enough. The Parking Location Tracking program was included to remedy that problem. This Container Control System will be rewritten but, driven by the information derived from the new system built around it, the time it now needs to update container movements has decreased 99 percent.

Perhaps the most difficult part of the design was finding the right piece of equipment to work in the field. The search looked at hardware from many vendors and different methods of communications. It took well over a year to settle on the Telxon PTC-750 Radio Frequency Handheld terminal as the only

unit capable of meeting all the requirements. During this search, major portions of the system were designed and some programming done, but most work had to wait on the outcome.

The YMS programs were written in six different languages. Much of the programming was done in Speedware, Infocentre's fourth generation language, which provided at least a five-fold increase in individual programmer productivity. It was used for most of the 3000 screens, reports and file maintenance. Most of the location assignment subsystem is written in Speedware and was designed around the assignment variation of the transportation method.

SPL and COBOL were needed to interface with the existing Container Control System because the system is so old. Also a few portions of the assignment system had to be done in COBOL because Speedware could not handle the many matrix operations required in memory.

Compiled BASIC and Macro Assembler were used for writing the PC applications. BASIC was used because Telxon supplied interfacing routines in that language with their equipment. Because they worked there was no reason to change them. Assembler was used for speed and those few machine functions BASIC could not access.

TCAL, a Telxon language, was used for programming the handhelds. The handheld program is menu-driven, coaching the user through all operations.

The last phase of implementing the system was training yard personnel to use the handhelds. Checkers, who are day-hire labor, and yard foremen were given this training. An individual usually learned to operate the unit in one three- to four-hour class.

The Future

The YMS is designed for expansion so it won't become obsolete as the port grows. Eventually, Virginia Port Authority's other three terminals will go on the system, and it will include vessel operations (tracking and moving containers offloaded from the ships) and rail movements.

This is a system with many other applications, such as warehousing or any traffic management application where data-gathering covers a large area (such as an open-air warehouse).

With the Yard Management System, Virginia port operations have entered the 2lst century. —*John Fusek is a system analyst for Virgina International Terminals, Newport, VA.*

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A GUIDE TO EXTRA DATA SEGMENTS

No Need To Worry When A Novice Encounters 'Stack Overflow'

PROGRAMMING

Marcy Viener

A new programmer entering the HP arena may think, "How different could the HP possibly be from the IBM I've worked on for the last four years — COBOL is COBOL." To a certain extent, this is true. A "move" is a "move" in any realm. But each computer has its limitations, including the HP 3000.

Almost every HP programmer has, at one time or another, executed a simple run command only to be confronted with the dreaded "Stack Overflow" MPE error. The stack limitation often is considered to be a problem with the classic HP 3000 architecture. This is only true if the programmer doesn't know how to work within this limitation. (The stack limitation no longer is an issue with the Precision Architecture of the 900 Series computers.) The experienced coder probably recognizes this error immediately and even may be able to come up with a workable solution quickly. But the once enthusiastic novice will sit and stare at his screen with a look of complete bewilderment.

The discovery of a potential stack problem usually occurs well after the design phase of a program is complete and well into the actual coding or unit testing (assuming someone has taken the time to provide the programmer with detailed structured design documentation). An uninformed programmer may attempt to work around the problem by modifying the source code and thus destroy the structure with which the program originally was conceived. However, this doesn't have to happen. By working with MPE and the stack structure of the 3000, a great deal of time can be saved during initial coding and future modifications that are made to the program.

The HP 3000 maintains code apart from data. Each program is allocated one "data segment" (in general) and at least one "code segment" during execution. It's possible to divide the code or procedure division of a COBOL program into multiple segments either to speed up processing time or to clean up a compilation error indicating the program has a "Code Overflow." Code segments can't exceed 16,383 words (32,766 bytes).

But this won't resolve a data stack issue. A "stack overflow" error results from insufficient stack space for the data segment of the code. In other words, there isn't enough room in the stack allocated to the data during the program run. This is especially prevalent in programs using large tables. Because it isn't possible to segment the data division of a COBOL program as you can with the procedure division, the programmer sometimes is confronted with this stack limitation issue.

There are many possible solutions to this problem. Four include:

1. Prep the USL with Maxdata = 32,000 (the actual maximum is 32,767 words or 65,534 bytes). This enables the stack size of the program to be maximized.
2. Run the program with the NOCB parameter. This is a request to the file management system to not use the program's stack for its own purposes, but to store information in an external data segment.
3. Redesign the program to minimize the amount of data stored in the data division. This may be possible if multiple reports are being written by the program, by using a separate program to actually print the reports.
4. Decrease the size of any tables used in the program wherever possible.
5. Make use of the Data Segment capability MPE allows.

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Step 1 always should be used as the first attempt to resolve the problem. The solution may be as simple as re-prepping the USL and running the program again. The second step may resolve the overflow, but the NOCB option can slow down processing when the program is executed. Step 3 may be an unworkable solution depending on the complexity of the program. Step 4 may not even be an option. It's the fifth option I would like to introduce to the novice programmer, or the experienced programmer who has never used the DS capability.

MPE allows a program to access extra data segments during processing. In effect, this gives the program/process the additional stack space necessary to run. There are four intrinsics that should be examined when considering using extra data segments: GETDSEG, DMOVIN, DMOVOUT and FREEDSEG. These intrinsics define the data segment, move the data between the stack the program is using and the extra data segment, and clean out the area to be used within the program.

GETDSEG: This intrinsic will retrieves an extra data segment (an area in memory) to be used by the program. The number of extra data segments that can be requested within one program is set during system configuration. MPE will need to know the maximum size of the data segment also set during system configuration. In addition, one of the parameters used during this call will define whether or not this data segment should be shared between other processes or should be unique to the calling program.

DMOVOUT: This intrinsic writes the data out to the data segment. It stores the data there until it's needed by the program. It can be considered an additional area of the working storage section of a COBOL program. Technically, the data is being moved from the stack assigned to the program to the extra data segment located in another area of virtual memory. The location returned from the GETDSEG call will be needed to move the data out to the extra segment. In addition, the "displacement" must be calculated to determine exactly where in the segment the data should be moved. MPE also will need to know the length in words the data takes up.

DMOVIN: This intrinsic takes the data that has been moved to the extra data segment by the "DMOVOUT" intrinsic and moves it back to the stack area allocated to the program. Again, MPE needs to know where the extra data segment resides and within that segment the starting location of the desired data. By indicating the length in words of the data, the exact ending location need not be specified.

FREEDSEG: This intrinsic releases an extra data segment that's been retrieved using the GETDSEG intrinsic.

The next step is to actually program with these intrinsics. I will give a more detailed example using the COBOL programming language, but this feature of MPE certainly is not limited to this 3GL. This capability enabled me to provide a clean resolution in a program I had designed for a client. The modification became a technical rather than functional issue, therefore I didn't need to involve my client. I was able to make the necessary changes without spending the extra time I would've been forced to spend had I needed to redesign the entire program.

I needed to load a table with data to be used multiple times during my program. Although the data came directly from an IMAGE dataset, it would have been very inefficient to read this dataset multiple times to retrieve the data. Therefore, during the design phase of the project, I decided to create a table within my program to store all of this information.

Each entry in the table needed to be 90 bytes long and I needed to allow up to 250 occurrences of data. Right there I had used up 22,500 bytes of the 65,000 maximum allowed for my data segment. Needless to say, when I ran my program for the first time I encountered that terrible "Stack Overflow." I

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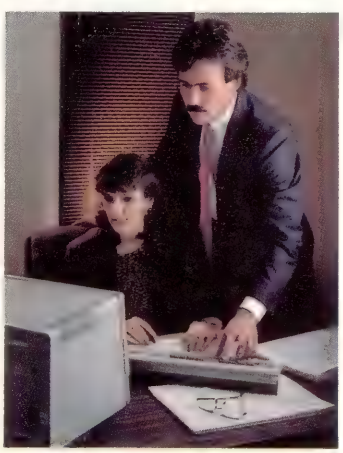

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CIRCLE 194 ON READER CARD

tried Step 1, but to no avail. I knew there was nothing I could do to limit the size of my data division and I didn't have the time nor the budget to redesign the entire program. Therefore, my next attack was to use extra data segments.

I decided to store all of the data from my table in an extra data segment, thereby reducing the size of my table from 22,500 bytes to 90 bytes. I moved all of the data to the extra segment when I loaded the table and moved it back into working storage; i.e., the stack when I needed it. This seemed to be a logical solution and by doing it, the structure of my program didn't get destroyed.

The working storage of my program looked like this:

```
01 CONTRACT-TABLE    PIC X(90).
01 CON-NO            PIC S9(4) COMP.
01 XDS-DATA.
   05 XDS-NUM        PIC S9(4) COMP.
   05 XDS-NAME       PIC S9(4) COMP VALUE 0.
   05 XDS-OFFSET     PIC S9(4) COMP.
   05 XDS-LENGTH     PIC S9(4) COMP VALUE 45.
```

The following fields will be used in defining the size of the extra data segment.

```
01 XDS-SIZE-CHARACTER.
     05 FILLER          PIC X(2).
     05 XDS-SIZE-X      PIC X(2).
     05 XDS-SIZE-C  REDEFINES XDS-SIZE-X PIC S9(4) COMP.
01   XDS-SIZE-REDEF REDEFINES XDS-SIZE-CHARACTER.
     05 XDS-SIZE-N      PIC S9(8) COMP.
```

The first thing I needed to do was to retrieve the extra data segment. The intrinsic call looked like this:

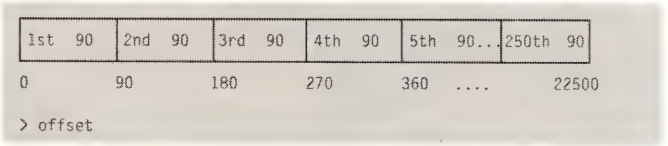
```
MOVE 22500 TO XDS-SIZE-N.   (Note: 90 * 250 = 22500)
CALL INTRINSIC "GETDSEG" USING  XDS-NUM,
                                XDS-SIZE-C,
                                XDS-NAME.
IF CONDITION-CODE NOT = 0
     DISPLAY "ERROR"
     STOP RUN
ENDIF.
```

By leaving the name parameter set to 0, I was declaring the extra data segment to be non-sharable. The number of the data segment (XDS-NUM) is returned if the call is successful. This number will be used to call the other intrinsics.

Once I had retrieved the segment, I was ready to load it with the contract data. The variable CON-NO was initialized at 1 and incremented each time these commands were run. I performed the following:

```
COMPUTE XDS-OFFSET = XDS-LENGTH * CON-NO - XDS-LENGTH.
CALL INTRINSIC "DMOVOUT" USING  XDS-NUM,
                                XDS-OFFSET,
                                XDS-LENGTH,
                                CONTRACT-TABLE.
IF CONDITION-CODE NOT = 0
     DISPLAY "ERROR"
     STOP RUN
ENDIF.
```

The first time these commands are performed, the offset will be equal to 0. The next time through, the variable CON-NO will be set to 2, therefore the offset will be 90, then 180, 270, 360, etc. The length of the data I am moving to the segment is 90, so I want to make sure I position everything correctly. The segment will look like this:



I retrieve one record at a time from my dataset (when I retrieve the data using a DBGET, the data in the buffer becomes part of the stack for my program) and move the data from the stack to the extra data segment. As I do this, I need to increase my offset by 90. This offset allows me to know exactly where each entry is located.

Once all of the data has been loaded into the extra data segment, I need to begin retrieving it. I use the same equation to calculate the offset.

```
COMPUTE XDS-OFFSET = XDS-LENGTH * CON-NO - XDS-LENGTH.
MOVE SPACES TO CONTRACT-TABLE.
CALL INTRINSIC "DMOVIN" USING  XDS-NUM,
                               XDS-OFFSET,
                               XDS-LENGTH,
                               CONTRACT-TABLE.
IF CONDITION-CODE NOT = 0
   DISPLAY "ERROR"
   STOP RUN
ENDIF.
```

This time, the data is moved from the extra data segment to the stack. If I want to retrieve the 150th entry in my table, I set the variable CON-NO to 150 and perform the above commands. I have defined which data segment I want to retrieve the data from, where in the data segment the data begins and how long this string is. I now can use the data in CONTRACT-TABLE to do whatever I need to do.

The last thing to remember is that because we are using the DS capability of MPE, the program must be prepped with this capability. In addition, the user, group and account must be set up with DS capability.

The use of extra data segments can be the answer to a stack problem, but this capability should be used with care. The architecture of the HP 3000 is something users can and should work with. This limitation won't stand in the way of systems development. It is important, however, to realize this limitation exists and develop practices to work within it.

Remember, there's no need to bury your head on your desk when you encounter a "Stack Overflow." It isn't the end of the world or the end of your program. There is always a solution. *—Marcy Viener is a senior staff consultant with Innovative Information Systems Inc., Norwood, MA.*

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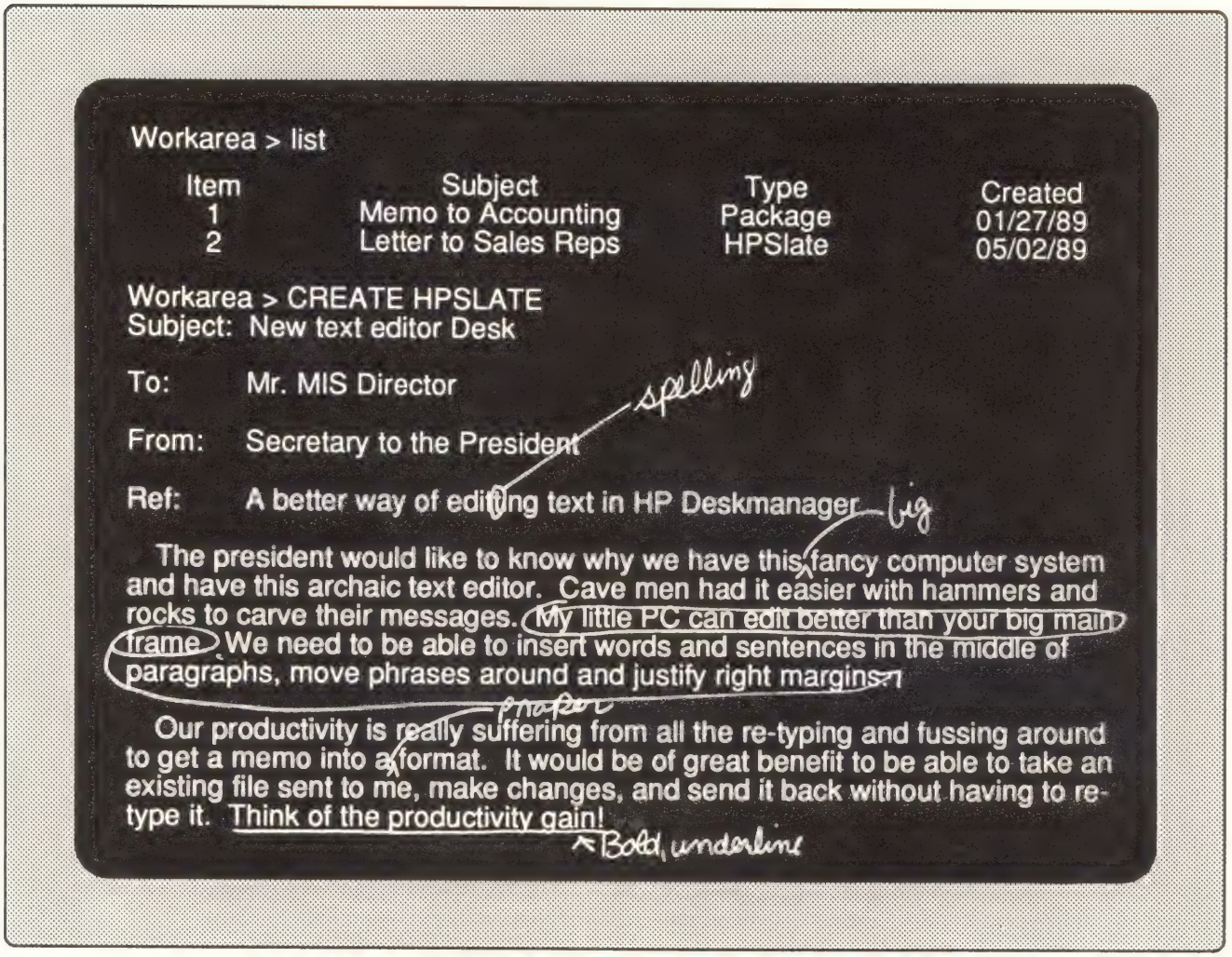

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CIRCLE 111 ON READER CARD

A Handy Utility For Presentation Graphics

LaserKey

MILES B. KEHOE

As personal computers become more and more powerful, software companies write increasingly complex programs to accomplish everything from document preparation to database management. In the midst of all the noise about graphical user interfaces and mouse-driven menus, I found a product that is easy to use and yet isn't overwhelming with unneeded features.

LaserKey from Arkwright Inc. (Fiskeville, RI) is a viable solution for people who spend time preparing slides, transparencies or free-form memos.

LaserKey provides 19 different templates for preparing presentation graphics. The idea is to find the form that most closely matches the type of format you want. Fill in the fields on the screen and print the results to your HP or PostScript compatible laser printer.

You don't need a mouse or even a high-resolution display. To configure LaserKey takes less than a minute if your system already can send text to your laser printer.

Configuration

LaserKey runs on a Vectra or any IBM compatible with 256K of memory and dual flexible disc and MS-DOS 2.0 or later. Even though LaserKey is used to prepare graphics slides, it doesn't require a graphics monitor to run. It supports the HP LaserJet II printer or any PostScript compatible printer.

I tested LaserKey on a Vectra RS/12 with 640K of memory, a 40-MB hard disc

HP PROFESSIONAL DP LABS TESTING CENTER

and a LaserJet II printer. I found no compatibility problems.

Layouts

The trick to LaserKey's ease of use is its simplicity. LaserKey provides 19 *layouts* or forms. To prepare a slide, load the blank layout you've choosen and enter text into the fields. The brief, yet well written manual shows you which layout to load for each type of form. Once the text is entered, LaserKey prints the form on your LaserJet II or PostScript printer. You can save the completed page for reuse later on.

For example, one of the layouts creates a page of 33 labels. By using forms that you also can purchase from Arkwright or from a good office supply store, you can use your LaserJet to print mailing labels, disc labels, etc.

LaserKey provides three label layouts, and each provides the additional ability to duplicate fields from previous labels. This allows you to easily create a page of the same label or to copy specific text from one label to the next.

One of the most common uses I've seen for high-powered presentation graphics products is to prepare overheads for meetings, training classes and sales presentations. You can use LaserKey for the same high-quality slides, including bulleted lines or free-form text, for much less money and with far less technical skill.

Some of the other standard layouts help solve one of the most difficult things to do with most presentation graphics programs — align text or currency amounts in two or three columns. Because LaserKey provides the fixed templates, you're able to align numbers easily.

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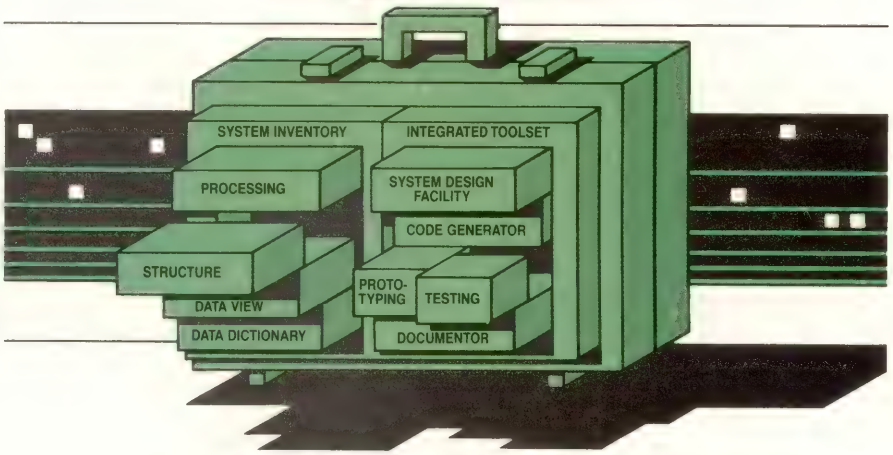

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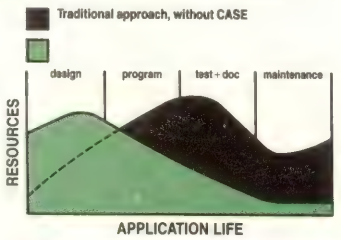

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select fonts or text sizes.

LaserKey provides four fonts on the HP LaserJet II printer: Helvetica, Helvetica Bold, Times Roman and Times Roman Bold. It supports 12, 24 and 36 point text in each font.

If you have a PostScript compatible printer, LaserKey supports Helvetica Oblique and Helvetica Bold Oblique, Times Italic and Times Bold Italic, Courier, Courier Bold, Courier Oblique and Courier Bold Oblique. All are supported in 12, 24 and 36 point text.

Hints

Arkwright also provides a hint sheet for novice users. As you can imagine, sometimes you can't print long lines of text in large font sizes without running off the page. In keeping with the simple approach, the software doesn't verify whether a particular line of text will print on the paper in the selected font size. The hint sheet suggests smaller font size or abbreviated text, and lets the user decide what to do. For several hundred dollars more, you could probably buy software that would tell you before you print.

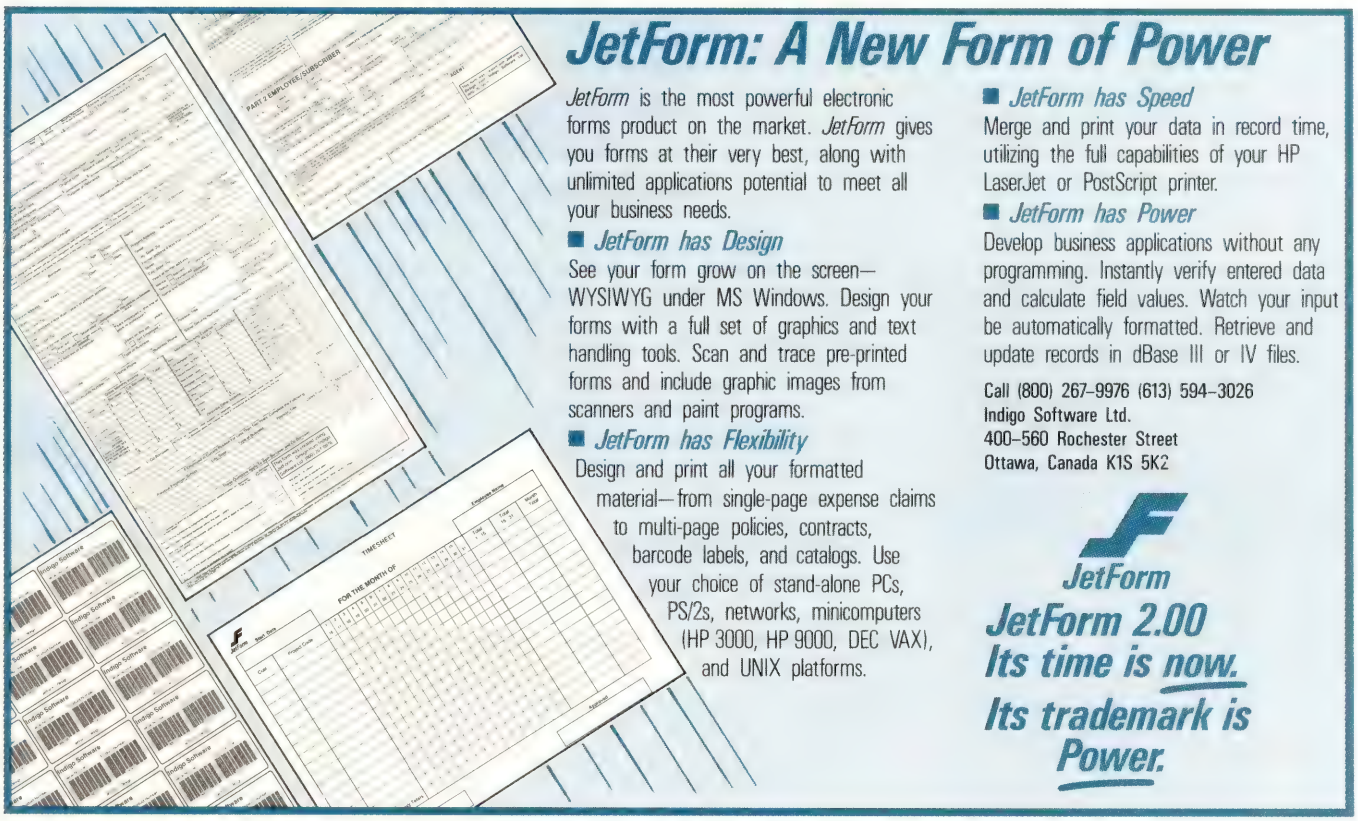
LaserKey is an easy-to-use product and provides all the features you need for preparing slides, transparencies, labels and free-form memos.

My overall impression of LaserKey is excellent. It's an easy-to-use product and provides all the features you need for preparing slides, transparencies, labels and free-form memos. They have avoided the "creeping feature set" that makes so many otherwise useful products complex.

There are only two minor points that could be improved. One is the user interface, which is close enough to the Lotus-style menus to be familiar, yet different enough to be a little frustrating at first. And, being able to print a slide to a file would offer great flexibility. With both HP's PCL and PostScript printers you may want to batch print a number of documents. If you could create a file with the actual printer commands, you would have the flexibility to do this and more.

If you spend any time at all preparing slides, transparencies, tables of numbers or text for reports, LaserKey might be a better solution than those powerful and expensive graphics program for you.

In any case, it's worth a look! ■



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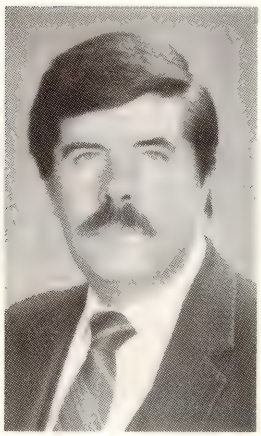

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CIRCLE 121 ON READER CARD

BACKCHAT

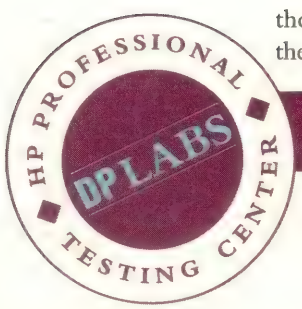
Sophisticated Database Management System

Joel Martin

BACKCHAT is a very sophisticated software system that allows you to replicate changes made on one database to another database on a different CPU. The people at Proactive Systems have crafted a complete and well documented product that brings significant distributed database functionality to IMAGE and Turbo-IMAGE databases, and they have backed the product with a strong reputation for technical and sales support.

Features

BACKCHAT enables you to mirror changes from one database to another database of the same name on a different CPU or in a different account. The target CPU (or CPUs) can be connected to the local CPU using either DS/3000 or NS/3000. The manner in which BACKCHAT works is that it reads records written to the TurboIMAGE log files on the local CPU, passes those records on to the remote CPU and posts those records from the log file copy to the mirrored database on the remote CPU (see *Figure 1*). The passing of records between the CPUs is done by the LOGX process of BACKCHAT, now referred to as BACKCHAT-LOG in the documentation, and the updating of the remote CPU is done by the DBX process, BACK-



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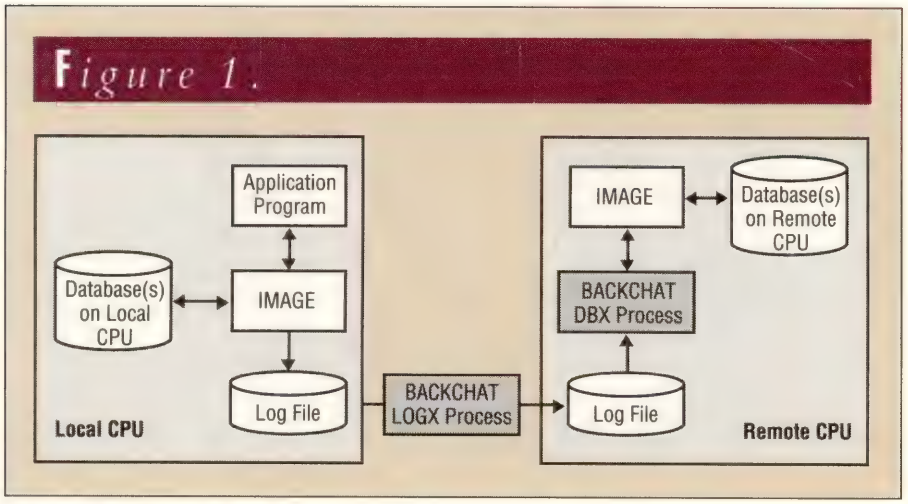

BACKCHAT Mirroring.

CHAT-DB.

On the surface this all sounds very simple, and it is. When your users change the local data, BACKCHAT communicates that change to a remote copy of the database, usually within seconds. The transfer of data is completely transparent to any applications running on either of the CPUs and requires no change to application or third-party programs.

Changes to several databases can be communicated between CPUs with only one LOGX jobstream on the local CPU, one LOGX session on the remote CPU and one DBX jobstream on the remote CPU.

Database changes can even be mirrored bidirectionally, from the remote to the local CPU in addition to from the local to remote CPU. (BACKCHAT includes "anti-feedback" logic to prevent changes from propagating infinitely, so once again no changes are necessary to your application programs.)

Some of BACKCHAT's features include: mirroring of individual datasets within a database if mirroring of the entire database is not desired; online inquiry of the status of mirroring including the times of the last transactions posted; support for both DS and NS/3000 communication links including dial-up, leased lines and X.25; restart and recovery from communication line failures and system failures; support for local and remote databases that have structural differences (with some limitations); mirroring to a second database on the same processor; and continuous transmission of changes between CPUs or scheduled transmission of changes by time of day and day of the week.

Three examples of how BACKCHAT can be used might better illustrate the products features:

- Branch offices — If your company manages many sales offices with separate order processing, but common price lists, then BACKCHAT can mirror price list changes from the home office to all sites. The user exit facility even provides a means of converting the price to the local currency before posting to the remote database. (A change in the U.S. dollar price at the home office can be translated to a change in the British pound price for the English office using the current exchange rate.) Changes made in warehouse inventory at the remote sites can be communicated back to the home office as orders are filled.
- Performance improvement — If you want to separate heavy reporting activity from your transaction processing, BACKCHAT can provide continual updating of a duplicate database on a CPU tuned for reporting. That duplicate database could support OMNIDEX or another indexing method even if the transaction processing "live" copy does not.
- High availability with fault tolerance — Changes to several databases could be mirrored to duplicate databases on a separate CPU to allow the backing up of the copy databases while the "live" databases continue to be used to process transactions. When the backup is complete, BACKCHAT then could be restarted to process any transactions performed since the backup began. The second CPU could be used as in instant backup in the event of a primary CPU failure.

Installation & Set-Up

Installing BACKCHAT involves several steps. After the files are restored from the product tape you need to set up logging on the local database, the local and remote databases need to be "equalized," and the LOGX and DBX processes of BACKCHAT need to be configured.

Restoration of the BACKCHAT files from the product tape is by the time-honored method of restoring a jobstream to the PUB group of the SYS account, adding the necessary passwords and streaming the job. As expected, the files restored with no trouble. I repeated the process on the remote CPU.

Following the restore of files, I added LG capability (for logging) to the account and users of my local database and turned on IMAGE transaction logging for that database. (Some knowledge of IMAGE transaction logging is necessary to setup BACKCHAT.) I set up the UDC commands as recommended so that initiating a logging cycle would also start BACKCHAT, and I equalized the databases. (Equalization of the databases usually requires no more than a STORE or DBSTORE of the local database and a RESTORE or DBRESTORE of the database to the remote CPU.

The BACKCHAT manual contains additional instructions and appropriate warnings if you are mirroring changes to a subset of the database's datasets.) Finally, I configured the BACKCHAT LOGX process on the local CPU and the BACKCHAT DBX process on the remote CPU.

Items that must be configured include the log id, the names of the IMAGE log files, the DS or NS device name of the remote CPU, the remote log on se-

quence, the datasets to be copied, scheduling information, and so on. There is a total of about 30 items to be configured for one LOGX, DBX pair.

From start to finish the whole process took about an hour and a half, though your mileage may vary depending on the size of your databases and your familiarity with IMAGE logging.

The set-up process is straightforward but can be a bit intimidating for the newer system manager.

The BACKCHAT configurator is similar in style to the MPE configurator used through the SYSDUMP facility of MPE V, and some of the terminology can be confusing. The simple prompt and response approach is sufficient but not very forgiving or friendly. If you make an error in spelling one of your responses, you may have to continue through the end of that section within the configurator before you can correct the error. (There is no apparent way to "back-up" to the previous prompt to retype the response.) On the plus side, the number of prompts for both LOGX and DBX are only a few (unlike the MPE configurator) and the same LOGX and DBX commands can be used to list the configuration you have just created.

Once you get the hang of it, changes to a configuration can be made in a few seconds. Complete reconfigurations can be done in only a few minutes. Even the newer system manager has very little to fear — the purchase price of BACKCHAT includes one free day of on-site training and configuration support.

Test Results

I used a database on our Micro 3000 XE to try BACKCHAT as a novice might. I followed the installation instructions in the BACKCHAT manual and I encountered no significant problems. (I did have to turn off IMAGE logging of the remote database after equalization.)

BACKCHAT is exceptionally easy to use when set up with the BACKCHAT user defined command as a substitute for the standard MPE LOG command. A single command on the local CPU can do all these steps: start a new logging

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cycle on the local database, open the DS or NS line to the remote CPU, start a session on the remote CPU, start the LOGX process of BACKCHAT to mirror changes from the local to the remote CPU, start a jobstream on the remote CPU, and start the DBX process of BACKCHAT on the remote CPU to post the mirrored transactions to the remote database. Because IMAGE logging allows you to log several databases to the same log file, you can start and stop the logging and mirroring of several databases with a single BACKCHAT command! In a typical environment that one command is the only one you will use from day to day. (The start of a new logging cycle will also require that you purge and rebuild the log files, a task that is easily incorporated into a jobstream.)

BACKCHAT is a polished product for distributing data from IMAGE databases across HP 3000 CPUs.

Changes I made to data on the local CPU through both an application program and through QUERY were transparently posted to the database on the remote CPU in only a few seconds. (The time between BACKCHAT checks is configurable. I used the default of five seconds.) The time required for mirroring would have been even less if not for several large jobs running on the remote CPU. Adds and deletes of data were also mirrored transparently as expected. One caution though — if the second CPU is significantly slower than the first, then a large batch update can introduce significant delays in the mirroring process.

I tried to force problems with BACKCHAT by reconfiguring the local CPU to mirror the changes to a detail dataset but not the changes to that detail's associated master dataset. The LOGX configurator noticed my "error" and asked if I wanted to include all associated master sets. I declined the offer and the configurator allowed me to proceed after the issuance of a stern warning. After restarting logging (and BACKCHAT) I added an item to the master set of the local database and then added items for the same key value to the detail set. The LOGX process correctly transmitted only the detail set changes to the remote CPU and the remote DBX process correctly aborted when it could not find the IMAGE chain head when attempting to put the detail record. The $STDLIST of the DBX jobstream left clear messages sufficient to allow me to isolate and correct my "error".

In short, the BACKCHAT mirrored all changes as claimed and would on a day-to-day basis require no more effort than that required to support IMAGE logging.

Documentation

The 260-page BACKCHAT manual is divided into 12 sections. Thanks to a complete table of contents and a good index, it's never a problem navigating from topic to topic.

The topics covered in the documentation go beyond that which is necessary to set up a simple mirroring such as I did for review purposes. There is a detailed explanation of how to set up each of four different "sample" configurations, including the mirroring of a database across two CPUs. Documentation of the User Exit Facility runs to more than 50 pages and includes a complete COBOL sample program of several hundred lines of source code!

The only changes I would like to see in the documentation would be an example of a configuration that mirrors a database across two CPUs, and a single section that covers the day-to-day operation of BACKCHAT.

BACKCHAT's warranty is for three months from the date of purchase, and includes free support during that time. Additional support and new releases are available for an annual fee of 15 percent of the then current purchase price. Proactive Systems can arrange 24-hour technical support if desired. To the benefit of the purchaser, the cost of BACKCHAT includes one day of on-site training and configuration assistance. (Travel and lodging are not included in the purchase price.) The day of on-site training and follow-up phone support include consultancy on getting the best use and implementation from BACKCHAT.

My experience with Proactive's technical support was exceptionally good, and the few questions I had during the test period were answered quickly and in detail.

BACKCHAT is a polished, robust and easy to use product for distributing data from IMAGE databases across HP 3000 CPUs. If your informational needs include the transmittal of shared IMAGE data across a local or wide area network, then you cannot go wrong with BACKCHAT. If your informational needs require the sharing by two or more CPUs of a database (or dataset) resident on a single CPU, then you should look into BACKBONE, the companion product to BACKCHAT. ■

BACKCHAT

SYSTEM REQUIREMENTS: HP 3000 running MPE-V or MPE-XL.

PRICE: $6,500 (first copy, Micro 3000) through $22,000 (first copy, HP-3000 Series 955). Pricing for the Series 960 had not been established at press time. The second and later copies are discounted up to 50%. Price includes one day of on-site training by Proactive Systems (travel and lodging extra). One year maintenance is 15% of current list price of products purchased.

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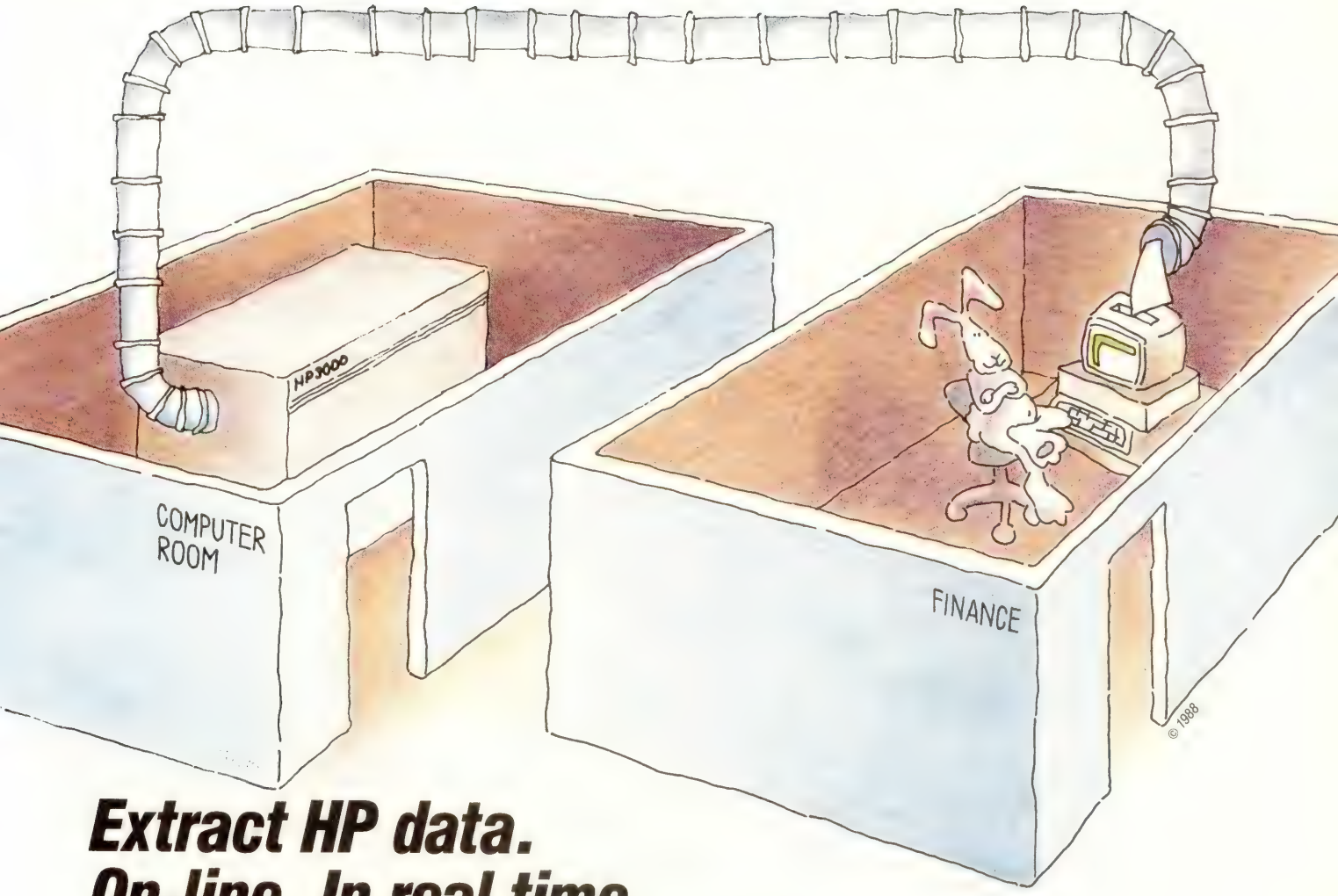

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HP-UX

Andy Feibus

Visual Utilities

This month's column is the last of three describing the documentation utilities available within HP-UX. Here, I'll describe how to add tables to your documents using **tbl**.

The **tbl** utility is documented in Section 1 of the *HP-UX Reference Manuals* and in the *HP-UX Concepts and Tutorials: Text Formatters* manual. **Tbl** is a preprocessor for **nroff** documents and is invoked using the command:

```
$ tbl -TX file | nroff
```

When viewing a **tbl** document on the screen, pipe the **nroff** output into the **col** command to improve the look of the output.

A series of **MM**-style macros are used to place tables into a document. The general format of these macros is the following:

```
.TS
options;
format.
data
.TE
```

The **options** line contains a set of **keywords** that describe the way the whole table is formatted within the document. All option keywords are separated by a space and must be terminated by a semicolon (;). Possible keywords and their meaning are described in *Table 1*.

The **format** lines describe the way in which each item or column in the table is formatted. More than one format line may be specified for a single table; each format line corresponds to a single line of the table and the last format line describes the remaining lines in the table. The last format line must be terminated by a period (.). A format line contains a series of **key letters** to describe the formatting used in each column of the corresponding line of the table. Possible key letters are described in *Table 2*.

Keywords and Keyletters define the format of the whole table as well as the individual lines and columns.

To change the font for a particular column, append a **B** (bold) or **I** (italic) to the key letter (e.g., **rI** is right-justified italic text). To specify a minimum column width, append a **w** (width) to the key letter for the column (e.g., **cw(4i)** specifies a column that is no less than four inches wide containing centered text).

If the all **box** option is not used, you can separate the two columns by placing a vertical bar (|) between the key letters for two columns (e.g., **l|c** specifies a left-justified column separated by a vertical bar from a centered column).

The **data** section contains the information to place into the table. Each item in a single line of the table is separated from the previous item by a **tab** (or, if the tab option is specified, by the specified tab character).

A simple table example follows:

```
.TS
center box tab (~);
c s
l l.
Possible Colors
black~white
red~green
blue~orange
brown~purple
.TE
```

This table description results in the following:

Possible Colors	
black	white
red	green
blue	orange
brown	purple

Nroff attempts to keep all boxed tables on a single page (unboxed tables

TABLE I

Keyword	Meaning
center	Center the table within the page (if not specified, the table is placed along the left margin of the page).
expand	Make the table as wide as the current line length.
box	Enclose the table in a single-line box.
doublebox	Enclose the table in a double-line box.
allbox	Enclose each item of the table in a box.
tab (x)	Use x instead of a tab to delimit items within the box. The parentheses are required.

Keywords describe the way the whole table is formatted within the document.

TABLE 2

Key Letter	Meaning
l or L	Left justify column item
r or R	Right justify column item
c or C	Center column item
n or N	Line up the decimal point for all numerical items in this column.
s or S	Spanning (previous column continues across this column). Used mostly for placing a single heading across two or more columns.

Key letters describe the formatting used in each column of the corresponding line of the table.

do not have this restriction). If a table can be drawn over more than one page, use the following table macro format:

```
.TS H
heading
.TH
options;
format.
data
.TE
```

The specified **heading** is a table header that is replicated on each page needed for the table.

If a non-boxed table must remain on a single page, precede the table description with the **.DS** macro and place the **.DE** macro after the **.TE** macro.

Each line in the table must be a single line of the input file. If a table line requires more than one input line, use the backslash (\) at the end of an input line to include the next input line as part of the current table line.

Another way to place large blocks of text into a column of a table is to precede the text block with **T{** and terminate the text with **T}**. A quick example:

```
.TS
box tab #;
lB | l | l.
Apple#T{
.na
A large fruit, usually red or green
in color, which contains many vitamins
and nutrients.
.ad
T}#30 calories
.TE
```

The example produces a table resembling:

Apple	A large fruit, usually red or green in color, which contains many vitamins and nutrients.	30 calories

And, finally, to separate sections of data within the table, insert a data line within only an underscore (_) between the sections to separate. For example:

```
.TS
box tab (~);
c s
l n.
Financial Summary for 1989
_
Gross Sales~192,250,000
Expenses~115,021,000
_
Net Profit~77,229,000
.TE
```

The example results in the following table:

Financial Summary for 1989	
Gross Sales	192,250,000
Expenses	115,021,000
Net Profit	77,229,000

For further examples, read the **tbl** section of the Text Formatters manual. Next month: time-based HP-UX utilities. *—Andy Feibus is president of Processware Inc., Atlanta, GA.*

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RDBMS

Fabian Pascal

Joining Tables

In the September column I described the basic relational table operators RESTRICT, PROJECT, PRODUCT, UNION and DIFFERENCE and ASSIGNMENT. The first five operations were taken by Codd, the inventor of the relational model, directly from the mathematics of set theory. As such, they are primitives; i.e., they can't be derived from combining other operations. That's why they're called "basic operations."

If you recall, "arbitrary nesting" of table operations is a crucial advantage of the relational approach. Users can pose extremely sophisticated questions to the database by combining operations the way they do in arithmetic with numbers. I've also shown that the PRODUCT operation doesn't make a lot of sense if used by itself, so it's primarily used in combination with other operations.

Codd observed that there are several such combinations that are likely to be used frequently because they underlie queries that are very common. In order to make relational DBMSs more useful, he added them to the basic operations. The intention was for users not to apply the combinations themselves, again and again, but rather to let the DBMS perform those combinations transparently. They're called "derived operations" because they're derived from the basic ones.

The most known derived table operations are JOINs. They're frequently used as sort of a distinguishing symbol of relational databases. They also demonstrate the usefulness of the PRODUCT operation. There are several types of joins.

The most common type of join is the *natural join*. To understand what it does, let's use an example based on our sample database (see *Figure 1*).

Suppose we wanted to find the project ID, code and name of all activities allocated to projects. Note that the PROJ# and ACT# of those activities are stored in the ALLOCATIONS table that doesn't contain activity names. Those are stored in the ACTIVITIES table. So the answer to this query must combine data from two tables. We learned previously that data from more than one table can be combined in relational databases by comparing values in common columns. In this case, the column ACT# is shared by the ALLOCATIONS and ACTIVITIES tables.

We can use the product operation to concatenate the rows of ACTIVITIES to those of ALLOCATIONS, and thus get the combination of data we need. However, there are more activities in

FIGURE 1.

DEPT#	DNAME	MGR#	RDEPT
A00	COMPUTER SVCS DIV.		
D01	DEV. CENTER		A00
D11	MFG. SYSTEMS	160	D01
D21	ADM. SYSTEMS		D01
E01	SUPPORT SVCS		A00
E11	OPERATIONS	310	E01
E21	SOFTWARE SUPPORT	100	E01

DEPARTMENTS Table

EMP#	ENAME	DEPT#	HIRED	SALARY	COMM
100	Spenser	E21	6/19/80		26150
150	Adamson	D11	2/12/72	25280	
160	Pianka	D11	10/11/77	22250	
310	Setright	E11	9/12/64		15900
250	Smith	D21	10/30/69	19180	
260	Johnson	D21	9/11/75	17250	

EMPLOYEES Table

PROJ#	PNAME	ERESP	STAFF
MA2110	PROGRAMMING	60	9.00
MA2111	PROGRAM DESIGN		2.00
MA2112	ROBOT DESIGN	150	3.00
MA2113	PROD CONT PROGS	160	3.00
OP1010	OPERATION		5.00
OP2010	SYSTEMS SUPPORT	100	1.00
AD3112	PERSONNEL PROG	250	1.00
AD3113	ACCOUNT PROG		2.00

PROJECTS Table

PROJ#	ACT#	EMP#	START	TIME
MA2112	180	150	7/15/82	1.00
MA2113	60	160	7/15/82	1.00
OP1010	130	310	1/ 1/82	1.00
AD3112	70	250	8/15/82	0.25
AD3112	180	250	8/15/82	0.50
AD3112	80	250	10/15/82	0.50
AD3112	60	250	1/ 1/83	1.00
AD3113	80	260	3/ 1/82	0.50
AD3113	180	260	4/15/82	1.00
AD3113	70	260	6/15/82	0.50

ASSIGNMENTS Table

PROJ#	ACT#	BEGIN	END
MA2112	70	1/ 1/82	7/ 1/82
MA2112	180	7/ 1/82	2/ 1/83
MA2113	60	2/15/82	9/ 1/82
AD3112	60	1/ 1/82	3/15/82
AD3112	70	1/ 1/82	10/15/82
AD3112	80	8/15/82	12/ 1/82
AD3112	180	8/15/82	1/ 1/83
AD3113	70	6/ 1/82	12/15/82
AD3113	80	1/ 1/82	4/15/82
AD3113	180	3/ 1/82	7/ 1/82
OP1010	130	1/ 1/82	2/ 1/83

ALLOCATIONS Table

ACT#	ACODE	ANAME
10	MANAGE	Manage/Advise
30	DEFINE	Define Specs
40	LEADPR	Lead Program/Design
60	LOGIC	Describe Logic
70	CODE	Code Programs
80	TEST	Test Programs
130	OPERAT	Oper Computer Sys
140	MAINT	Maint Software Sys
160	ADMDB	Adm Databases
170	ADMDC	Adm Data Comm
180	DOC	Document

ACTIVITIES Table

The Project Management Database.

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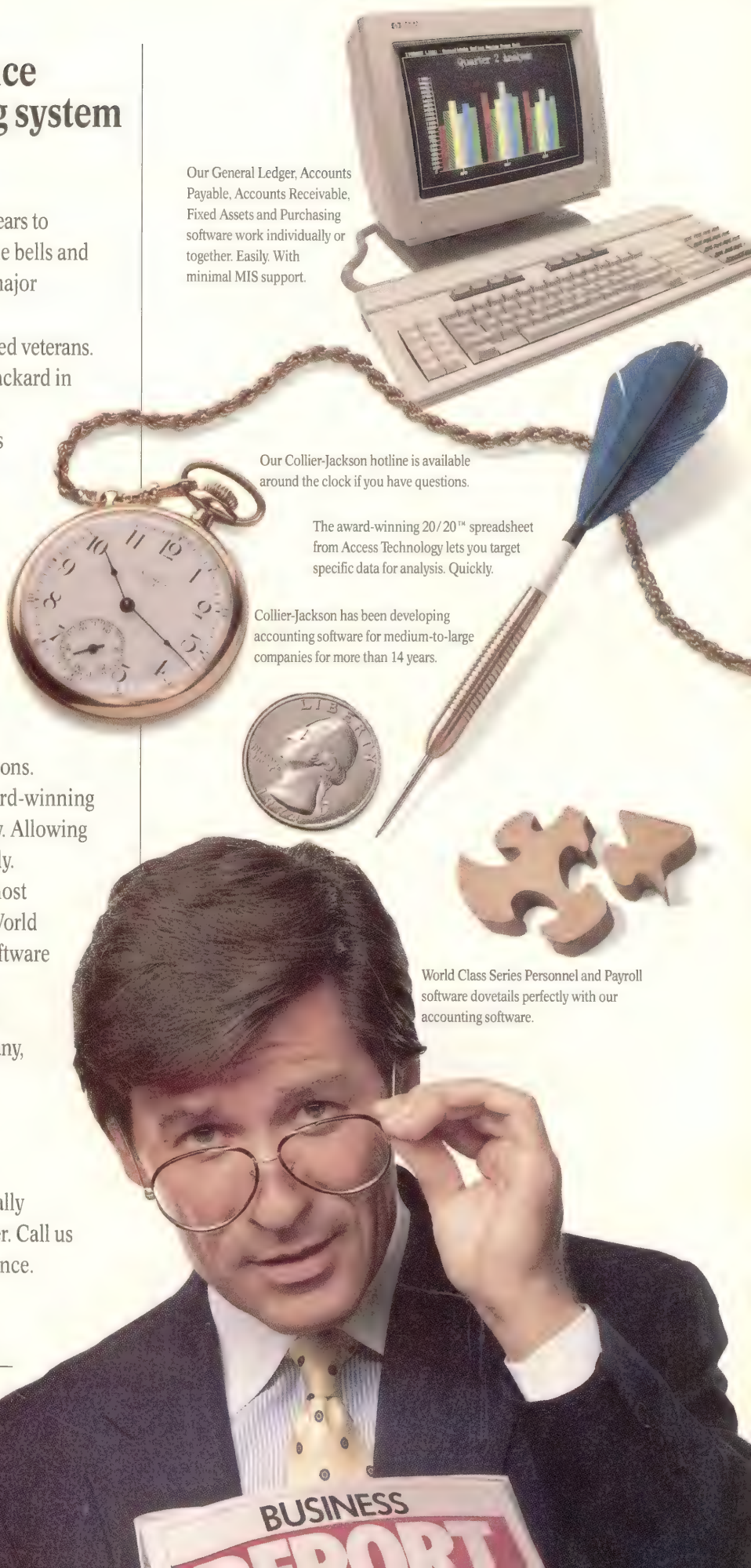

HP 3000 NATIONAL PROGRAM

CIRCLE 164 ON READER CARD

ACTIVITIES than in ALLOCATIONS because some of them aren't allocated to projects. We only need the allocated ones, so we must restrict the result of the product operation only to the allocated activities. This can be done easily by applying the condition:

```
ALLOCATIONS.ACT# = ACTIVITIES.ACT#
```

to the product result. The rows that don't comply with this condition will be those activities that exist in the ACTIVITIES, but not in the ALLOCATIONS table; i.e., the unallocated activities. Therefore, they'll be excluded.

But we still have a problem. We only want the PROJ#, ACT# and ANAME of the included activities, while the result will not only have all the columns of both tables, but also contains ACT# twice, once for each table. Solving this problem is easy, too. The project operation can be applied to the result to exclude all the unnecessary columns. In other words, the answer to the query is a combination of three operations as follows:

```
PROJECT(RESTRICT(allocations PRODUCT actypes))
```

The intent of derived operations is to let the DBMS perform combined operations transparently.

This combination is a natural join, and is shown in *Figure 2*.

Note: Because we've excluded unallocated activities from the result, this operation is called an INNER join. We will see later on that it is possible to include such activities in the answer, in which case the join will be an OUTER one.

A natural join is a special case of joins that apply the equality operator (=) called *equi-joins*. Its distinction is that it eliminates one of the two shared columns from results. Equi-joins that aren't natural joins leave both columns in the result.

Obviously, = isn't the only operator we can apply to compare values. Any combination of the > and < operators also can be used. For example, suppose the EMPLOYEES table was split into two tables, each containing salaried and commissioned employees, as in *Figure 3*.

Now, suppose we wanted to find names and salaries of employees whose salaries are greater than any of the commissions. This case is similar to the previous query, except that the restricting condition is now:

```
SAL_EMPL.SALARY > COMM_EMPL.COMM
```

This is still a join (data from two tables is combined based on value comparisons), but it's called a *theta join* because it uses the > operator instead of =. The result is shown in *Figure 4*.

In this case, all rows in SAL_EMPL are included, because all salaries are greater than every commission.

In the previous examples, the two tables to be joined were distinct. But this isn't necessary. There are cases where we want to perform SELF JOINs; i.e., to join a table to itself. For example, what if we wanted to pose the same query as the last one, but the EMPLOYEES table was in its original form, not split in two? The same theta join would be a self join, applied not to two different tables, but to sort of two copies of the same table.

In future columns I'll cover INTERSECT, DIVIDE and the outer extensions to some of these operations. —*Fabian Pascal is president of micro-paSQaL, a Washington, D.C., consulting firm specializing in relational database management and SQL on the PC.*

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FIGURE 2.

PROJ#	ACT#	ANAME
MA2112	70	Code Programs
MA2112	180	Document
MA2113	60	Describe Logic
AD3112	60	Describe Logic
AD3112	70	Code Programs
AD3112	80	Test Programs
AD3112	180	Document
AD3113	70	Code Programs
AD3113	80	Test Programs
AD3113	180	Document
OP1010	130	Oper Computer Sys

Natural Join.

FIGURE 3.

EMP	# ENAME	DEPT#	HIRED	SALARY
150	Adamson	D11	2/12/72	25280
160	Pianka	D11	10/11/77	22250
250	Smith	D21	10/30/69	19180
260	Johnson	D21	9/11/75	17250

SAL_EMPL Table

EMP#	ENAME	DEPT#	HIRED	COMM
100	Spenser	E21	6/19/80	26150
310	Setright	E11	9/12/64	15900

COMM_EMPL Table

Split EMPLOYEES Table.

FIGURE 4.

ENAME	SALARY
Adamson	25280
Pianka	22250
Smith	19180
Johnson	17250

Theta Join.

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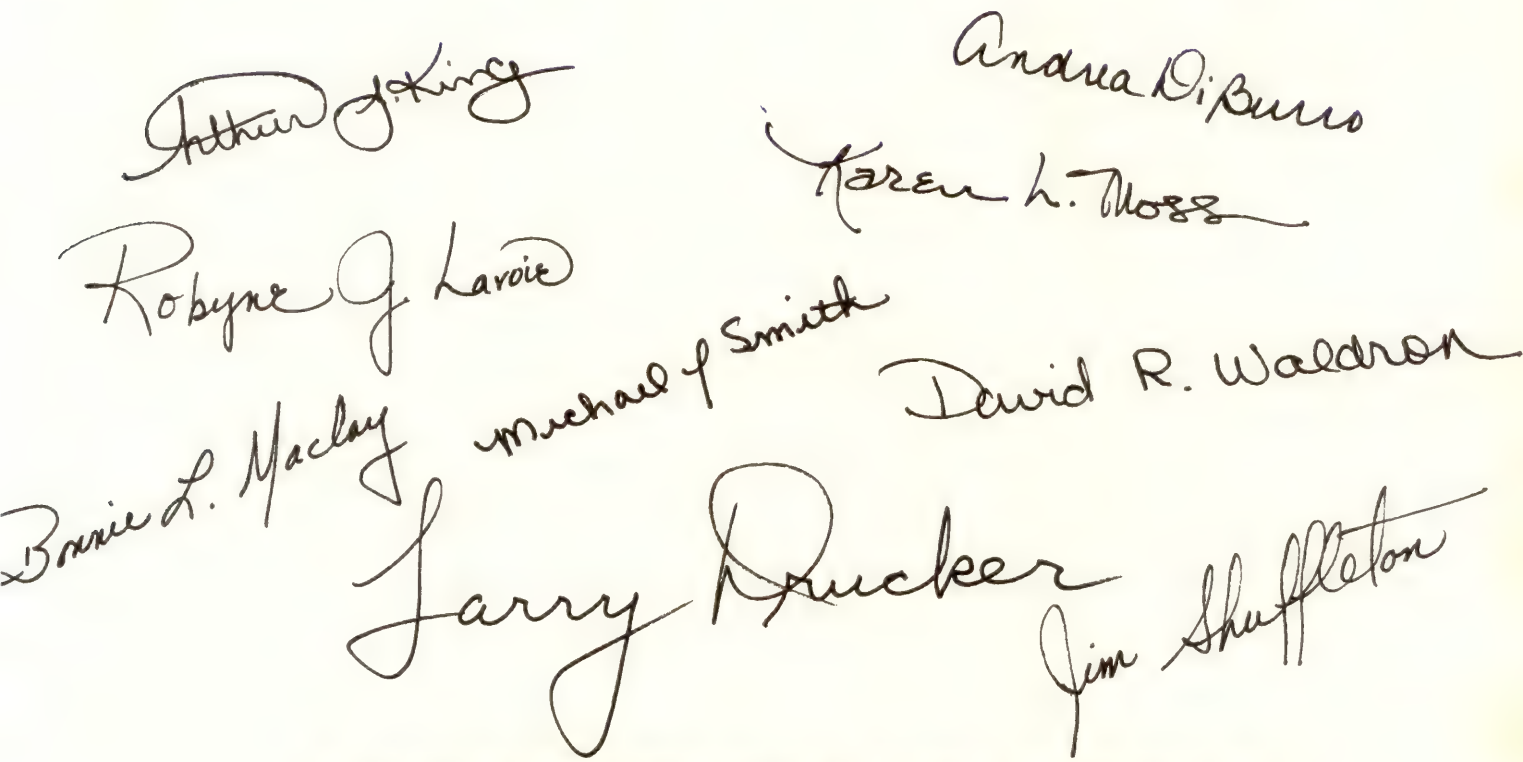

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CIRCLE 136 ON READER CARD

PC TIPS

Miles B. Kehoe

Hard Disc Management

Remember what it was like when you first used a computer? Remember the revelation the first time you successfully created a directory, or when you first found out how to delete more than one file at a time using wildcards?

Last week, I received a phone call from a fellow who makes his living advising people how to invest their money. Despite his expertise in financial matters, he was completely lost when it came to using his Vectra effectively. After an hour or so, I helped him clean up his hard disc and helped him make his system much easier to use. More importantly, I think he finally understands some of the fundamentals of good hard disc management.

There is a first time for everybody.

Starting Out

To try some of these disc management concepts, you'll need to exit PAM and work directly with MS-DOS. The easiest way to do this is to run the MS-DOS Command Processor, COMMAND.COM. This application exists on nearly every system running PAM. When you want to, you can get back to PAM by typing EXIT.

If your copy of PAM sports function key [f8] with the label 'Exit to MS-DOS', I suggest you start MS-DOS this way instead of running it as an application. This saves you some memory, and will make sure that PAM is not around to confound the results. To re-start PAM here, you need to run PAMCODE, probably from the root directory.

Once you exit PAM, you'll see the MS-DOS command prompt. Depending on how your system was set up, it could be as simple as the drive letter followed by a greater than symbol (>). It may also show you a more complex prompt, ranging from the time and date to the current working directory. No matter what is set now, let's set the prompt to the current working directory. In addition, set the current directory to the topmost directory on the drive. Type:

```
PROMPT $P$G
CD \
```

Directories And Files

Now you are at the very top of the MS-DOS directory structure. If you type the MS-DOS DIR command, you will see all the various files and directories on your disc. If you're like many people, this list will be very long, and you may want to examine the directory listing one screen at a time by typing:

```
DIR /P
```

This tells MS-DOS to pause after every 25 lines of output. A CTRL-C should stop the list at any point; any other character will display the next page of filenames.

You'll see some familiar names here: In addition to the system names such as COMMAND.COM, AUTO EXEC.BAT and CONFIG.SYS, you may recognize some of your programs or data files. If you already are using directories, you will see some files with a <DIR> in the third column. These are names of complete directories, but because they are under the current level, they are often called subdirectories. For the most part, you can use directory and subdirectory interchangeably.

If you already have your files in directories, you're doing the right thing. If you don't have any subdirectories, I'll show how you can make use of them, and why you should.

Why Use Subdirectories?

Here's a real-world example of why using subdirectories is so important.

Take a quick mental tour of an office. Somewhere there is a filing drawer that includes a collection of hanging files and manila folders. That's because people don't file all the papers, memos and articles they get in serial fashion. It's almost human nature to organize files by subject. When you need to retrieve a particular file, you can go directly to the folder that contains all the papers you have on that subject and locate the individual document much more quickly.

Now, in that same office, take a look at the hard disc. In my experience, there's a better than even chance that the files on this disc are all stored in the same directory. Hundreds of programs, letters, databases, games, and hot stock tips all filed there, one after the other, in sequential order. The owner of the disc will be hard pressed to tell you which files go with which programs. He also may be wondering why the hot '286 processor and fast disc are running so slowly lately. There is a reason.

When you open a file inside of an application, MS-DOS actually scans every file in the directory to locate the file you've specified. If that file is the first file in the directory, your application will quickly return with the data. If there are 300 files ahead of yours in the directory, MS-DOS will have to scan through each and every one of those files before it can return to your application. And this happens not only when you open the

file, but whenever MS-DOS needs the other information stored in the file name entry.

The degradation in system performance is gradual, but one day you'll notice how slow your system has become. If you take the time to organize your hard disc into logical directories, your system can get back some of the zip it had when it was new.

If you ask the office occupant why his filing cabinet is so well organized, he will tell you how important it is for him to get what he needs quickly. If you ask him why he doesn't use directories on his hard disc, he may explain that he just doesn't think he needs directories. In fact, what manila folders are to your filing cabinet, directories are to your hard disc.

The Basics

Before you can really start organizing your hard disc, there are a few things about MS-DOS you should understand. First, there is the issue of terminology.

You probably know that in MS-DOS, file names can contain a name of one to eight letters, numbers and characters; followed by a filetype of zero to three letters, numbers, and characters. You also know that by providing a disc drive letter followed by a colon you can tell MS-DOS which disc the file can be found on. Thus, some valid file names include:

```
CHECKS.PAY
COMMAND.COM
AMEXNOTE
A:TEST
```

What you may not know if directories are new to you is that a fully qualified filename also will include a path. So, for example, if the above files were all located in the root or top directory, the fully qualified filenames are:

```
\CHECKS.PAY
\COMMAND.COM
\AMEXNOTE
A:\TEST
```

Note the path name goes between the drive letter and the filename. When you begin using directories, the backslash (\) character is the magic character to identify the difference between just any file name and a directory name.

Directory Related Commands

There are three basic commands you use to navigate around directories. One lets you create a directory; one lets you change your current working directory; and one lets you delete a directory once it's empty and no longer desired.

To create a directory, use the MKDIR command. For example, if you're in the root (top) directory on your hard disc and you want to create a directory for all of your Drawing Gallery files, simply type:

```
MKDIR DRAWGAL
```

Note that the name is arbitrary: Drawing Gallery actually defaults to a

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directory called GALLERY. If a directory of that name already exists, MS-DOS will tell you. Because directories are just special types of files, you can't have a file and a directory with the same name.

The directory C:\DRAWGAL now exists. To change to DRAWGAL, use the CHDIR (or CD) command:

```
CD \DRAWGAL
```

If you now use the DIR command to list files in the DRAWGAL directory, you will see something like this:

```
Volume in drive D is TEXT
Directory of D:\DRAWGAL

.                9-19-89 10:49a
..               9-19-89 10:49a

      2 File (s) 18358272 bytes free
```

The only two files you see are named (.) and (..) . These are special shorthand representations of the current directory (the single dot entry) and the directory above the current one, called the parent, represented by the double dot. There should be no other files in a newly created directory.

Now that we're in the new directory, you can copy files from elsewhere or create new files. However, before we create any files here, let's look at the third command you'll need to master to understand directories, the RMDIR command.

RMDIR, or ReMove DIRectory, is used to erase directories you no longer want on your disc. RMDIR is for directories what the DEL command is for normal files. The difference is that removing a directory can have much broader impact if you accidentally remove it. For your protection, MS-DOS won't allow you to remove a directory that contains any files. To try out the RMDIR command, change to the top directory and use RMDIR:

```
CD \
RMDIR \DRAWGAL
```

This will remove the DRAWGAL directory from your hard disc.

Before going on, I want to talk about the two special files . and ,, that exist inside of a directory. When you created a new directory earlier, these two entries were the only two files shown when you looked at the directory.

The dot directory represents the current subdirectory. The two dot file represents the parent directory. Here's an example:

Create a few directories as follows:

```
C:\ > MKDIR TEST1
C:\ > CD TEST1
C:\TEST1 > MKDIR TEST2
C:\TEST1 > MKDIR TEST3
C:\TEST1 > CD TEST2
```

Now copy a file from the root directory to the current directory, C:\TEST1\TEST2:

```
C:\TEST1\TEST2 > COPY C:\COMMAND.COM .
```

The single dot is a place holder for the current directory. To change to the C:\TEST1 directory, there are two possible commands to use:

```
C:\TEST1\TEST2 > CD ..
```

will change to the parent directory of C:\TEST1\TEST2 which is, of course, C:\TEST1. Alternatively, you could have given the actual directory to change to:

```
C:\TEST1\TEST2 > CD C:\TEST1
```

With this information you now can create directories, make your directory an active directory and you know how to remove unwanted directories.

Next month I'll show you how to move around in your directories, how to copy files from one directory to another, and more. —*Miles B. Kehoe is an online support manager for Verity Inc., Mountain View, CA.*

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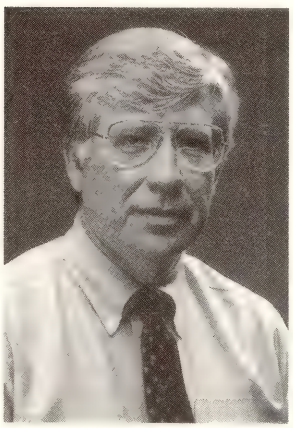

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CIRCLE 151 ON READER CARD

FIELD SERVICE

Ron Levine and Susan Hurley

Caring For Your Diskettes

You already know what a diskette is, but if you're new to desktop computing, you may not known how sensitive this media can be.

The diskette is a thin, flexible or rigid, mylar disk with a magnetic oxide coating (data is recorded on this coating).

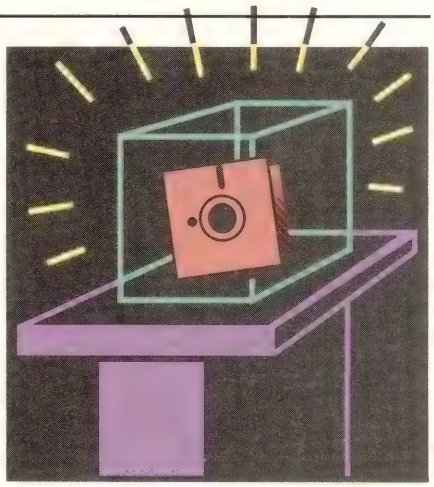
The flexible diskette is usually 5 1/8 inches (130.2mm) in diameter and is enclosed in a 5 1/4-inch (133.5mm) square jacket. The rigid diskette is 3 1/2 inches. The interiors of the jackets of both are lined with a low-friction coating that traps dust particles that helps to keep the diskette clean.

The diskette must be handled and stored properly to avoid loss of the recorded data. A damaged or contaminated diskette can impair or prevent recovery of data (sometimes the data is there but a damaged diskette prevents it from being retrieved) and can damage the equipment.

Protecting Your Diskettes

To protect your diskettes, follow these guidelines:

- Diskettes are very delicate. They can be damaged by any number of things and just one bit changed, added, deleted or rearranged (by dust, wear, liquid, electrical interference, etc.) in an important spot on the diskette can cause chaos. If a bit is deleted or changed in the file directory, that file can't be retrieved and is lost forever (always have a backup copy). If this happens in a program, it could render that program useless. Also, damage done often isn't found until much later, when you no longer remember what could have caused it. At that point, the problem often is blamed on the hardware, bad programs or any number of harder-to-fix alternatives, which can cost you a lot of money in unneeded repairs.
- Always place the diskette back in its protective envelope after use. It's best to store them in a plastic diskette box specifically made for their storage. Most diskette boxes state the maximum number of diskettes they hold. The low-friction coating inside the square jacket traps dust and smoke particles to keep them from getting on the diskette itself. When crowded (such as stuffing more than the maximum number of diskettes into a box), the pressure exerted forces the dust particles onto the diskette. For this reason, never stack your diskettes or set anything on top of them, and don't use paper clips or rubber bands with them. Stacking diskettes also can cause them to warp.
- When labeling diskettes, write first on the label, then put the label on the jacket. Never use a pen or pencil that can leave indentations on the diskette (pencils also leave graphite particles to cause damage at a later time) or erasers (which leave particles, too). If you must make a change on a diskette label already on the jacket, use a felt-tip pen, press very lightly and don't rest your hand on the diskette while doing so.
- Never place fingers on the diskette through any openings in the jacket (these slots expose the magnetic surface). Your hands contain an oil that is disaster to a diskette.
- Don't smoke around the diskettes. Smoke, ashes and even the presence of ashtrays can cause havoc that won't be found until later when you try to read a file and you get nothing but a mess.
- No liquids or sprays should be allowed around the computer. Any diskette that comes in contact with either should be discarded. Even when it dries, residue from the liquid remains (even water leaves rings). Once the diskette has dried, it's almost impossible to notice the residue, thus, when the disk fails, it's the last thing to be blamed. Don't save it — it's not worth the money it will cost in unneeded repair bills later. If you must use an antistatic spray, pack up your diskettes first.
- No fumes should be around the diskettes (nail polish, glues, cleaners, etc.).
- Keep the diskettes away from any type of magnetic fields (when diskettes are purposely erased, a magnet is waved over them). A magnetic field can be found around magnetic objects (magnets, of course, and some screwdrivers), objects that contain hidden magnets (such as your telephone, radio, car ignition switch), objects that can become magnetized over time (paper clips, keys, metal filing cabinets, anything metal), or objects that can produce electromagnetic interference (flourescent lighting, dimmer switches, most carpeting or any object/appliance that contains an electric motor, such as a vacuum cleaner). Never leave diskettes lying on top of the video monitor.



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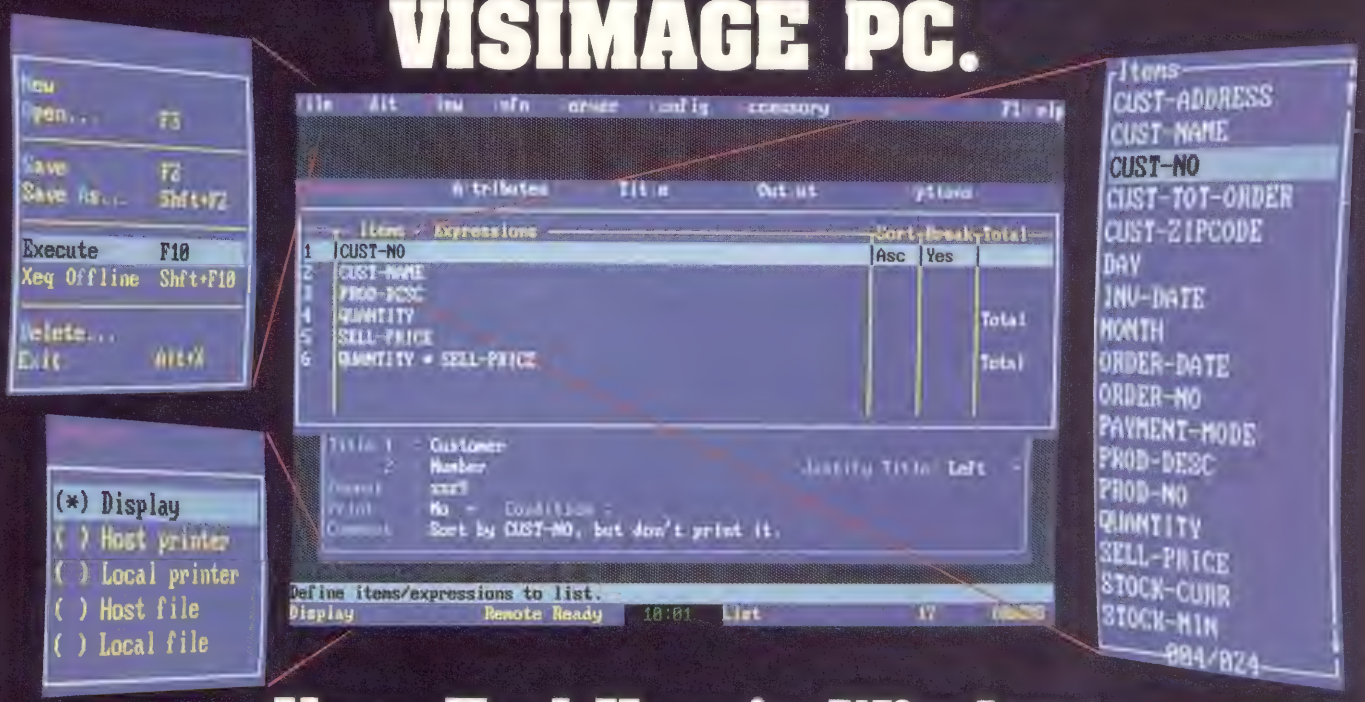

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CIRCLE 186 ON READER CARD

ing around on the carpet on a warm or dry day. And, believe it or not, don't point to a diskette on a warm or dry day. A spark can "zap" your disc if you aim it by pointing your finger (you need not be touching the disk).

Antistatic mats and sprays can help cut down the static electricity in the room, but the above precautions still must be taken. You also can help keep diskettes away from magnetic fields by storing them in a plastic container. Remember, however, that plastic will not protect from objects already highly magnetized, it just helps your odds a little.

- Any interruption in the power source while diskettes are in the drives can erase the disks. Don't use your computer in storms or other weather that plays havoc with the power lines. If the power goes down unexpectedly, remove your disks from the drives. When the lights go on again, the surge in power could wipe out your data. Also, don't test your building's fuses or circuit breakers when the computer is on.
- Diskettes are sensitive to jarring. Avoid dropping them on the floor, banging them around or placing them near anything which vibrates (don't keep them next to the printer). Also, don't set your diskettes on top of the phone (when it rings, your data takes a hike).
- Normal use eventually will cause your diskettes to wear out (another reason to keep backups). Once in awhile, check the hub access opening of your most-used diskettes for signs of wear. When you buy your blank diskettes, either buy those with reinforced hub rings or ask about hub rings that you can put on yourself. These will help to prolong the life of your most important diskettes. Also, check the oblong opening in your diskette's jacket for shiny rings forming on your diskette. Though this is actually a sign of disk drive problems, your diskette can be ruined and will need replacement, too.

When you buy program diskettes, back them up immediately. Then store the diskettes you bought and use only the backups. Never store data on a program disc; use a blank disk for storing instead.

- Always store a backup copy of your diskettes in another room (or building, if possible). Many people put off backing up any diskettes until the day that one is erased with a week's work on it. Once this happens, you'll never forget to back up a diskette again!

Renew your diskettes about every six months. In other words, re-back up the diskettes to refresh the data on them (the data and program on a disk tend to lose their magnetism after time). Renew the formatting at the same time.

- Because of the 5 1/4-inch diskette's ability to flex or bend, it's sometimes referred to as a "floppy disk." However, you shouldn't flex or mutilate the disk.
- Never remove a diskette from the disk drive when the BUSY light is on.
- Keep the diskettes stored at room temperature. Damage or loss of data may occur at temperatures exceeding 50F-125F (10-52C) or any humidity other than 10-80 percent. Never set diskettes on other appliances/equipment that may heat up during use; diskettes will warp. Once warped, they don't run properly in the disk drive (and they can't be straightened — throw them out). Never leave the diskettes in a car or in the sun. If you do happen to have the diskettes in one temperature extreme and transfer them to another temperature, wait 24 hours before trying to use them in your computer system.
- When mailing a diskette, put corrugated cardboard on both sides (cut larger than the diskette) and label it "no bending," "no X-rays," "fragile," "magnetic media," etc. There are disk mailers available.
- If you travel with your diskettes, keep them away from airport X-ray machines, these machines give off harmful electromagnetic rays. ■

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CIRCLE 174 ON READER CARD

Continued from page 26.

QMS Expands 22 PPM QMS-PS 2200

QMS Inc. announced that its QMS-PS 2200 printer is available in two versions. The QMS-PS 2200 Model E printer features Adobe PostScript printing capabilities plus hardware-resident HP-GL and HPPCL emulations. The QMS-PS 2200 Model S printer ships with PostScript printing capabilities only.

The QMS-PS 2200 Model S printer has all the controller functionality of the Model E, except for the LaserJet+ (HPPCL) and HP 7475A printer/plotter (HP GL) emulations. Both models feature a 16.67 MHz/68020 MPU-based internal controller with 4 MB RAM, 1 MB ROM and 39 resident Adobe PostScript typefaces. The printers also ship with QMS-PS utility software, a collection of startup, testing and printer operation utilities. A field-installable emulation upgrade option is available for Model S users who wish to add HP-GL and HPPCL support to their printers.
Contact QMS Inc., One Magnum Pass, Mobile, AL 36618; (205) 633-4300.

Circle 384 on reader card

WRQ's Reflection Updated With New Features

Walker Richer & Quinn, developer of Reflection terminal emulation software, announced shipment of version 3.3 of Reflection 1PLUS and 3PLUS for the Apple Macintosh. Both emulate Hewlett-Packard 2392A and 2393A terminals.

The backup and restore capabilities of version 3.3 allow you to backup an entire Macintosh hard disc to a single file on the host computer. Subsequent backups optionally can send only those files that have changed. Backups that are interrupted can be resumed without having to re-send the files already sent.

Version 3.3 for the Macintosh also has enhanced and streamlined printing capabilities. You now can select any font style and size.

Version 3.3 of Reflection 1PLUS and 3PLUS works on Apple Macintosh Plus, II, IIx, IIcx, SE/30, and SE with a minimum of 320K and requires system 5.0 or higher.

Reflection for the Macintosh includes a user manual, technical reference manual, command language manual, and a quick-reference mousepad. Single unit price is $299 for Reflection 1 and $399 for Reflection 3.
Contact Walker Richer & Quinn Inc., 2815 Eastlake Avenue East, Seattle, WA 98102; (206) 324-0350.

Circle 385 on reader card

MiniSoft 2392 Available For Xenix Operating System

MiniSoft has begun shipment of MiniSoft 2392 for the Xenix operating system. MiniSoft 2392 is a terminal emulation and data communications package that provides a complete emulation of the HP 2392A CRT terminal.

MiniSoft 2392 features ASCII/Binary file transfer between Xenix and HP 3000, HP 9000 and HP 1000 host computer systems. In addition, MiniSoft 2392 includes the ability to redirect the output of Xenix applications to host based printers.

Other features include a command language, foreign language support, user configurable function keys, multiuser operation, hotkey, multipage scrolling memory, automated file backup and support of baud rates from 300 to 19,200.

The Xenix version of MiniSoft 2392 is priced at $199. The DOS version is $99.
Contact MiniSoft Inc., 16315 N.E. 87th, Suite B101, Redmond, WA 98052; (206) 883-1353; (800) 682-0200.

Circle 389 on reader card

Best Releases checkUPS Powerwatch

Best Power Technology Inc.'s checkUPS powerwatch software provides intelligent two-way communications between a computer and the FERRUPS uninterruptible power system it supports and is now available for all Novell local area network (LAN) products.

checkUPS proprietary software automatically informs you when line power has failed and the system is being supported by Best's FERRUPS unit. In the case of extended line power failure, checkUPS automatically saves data from memory to disc files, close out work in progress and trigger an orderly shutdown of the entire system, emulating a highly-trained human operator using Novell's own utilities and commands.

checkUPS is available for Novell's Advanced Netware 2.10 and above, SFT Netware 2.10 and above, and ELS Level II, V.2.12 and above. The Novell version is priced at $200.

checkUPS software also is available on DOS, VAX/VMS, AOS/VS, PRIMOS, UNIX, Altos Xenix and other UNIX workalikes and Pick systems.
Contact Best Power Technology Inc., F. N Siegler, P.O. Box 280, Necedah, WI 54646; (800) 356-5794.

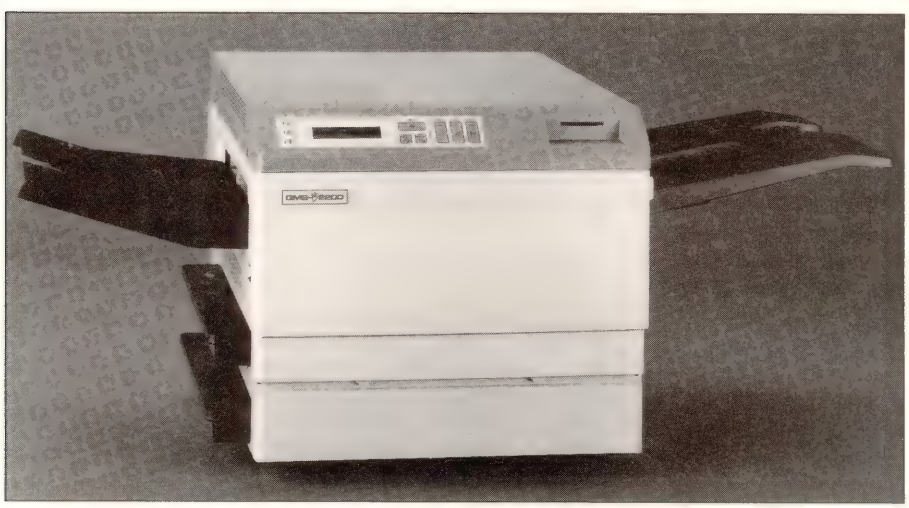
Circle 381 on reader card

HP Expands UNIX System Product Family

Hewlett-Packard has introduced its first server and a low-priced multiuser minicomputer based on the UNIX operating system.

The HP 9000 Model 635SV, based on HP-UX is U.S. list priced at $49,000 with features to compete against the DECstation 3100s and the Sun SPARCserver 330.

The HP 9000 Model 808S is an eight- user, entry-level multiuser minicomputer that also runs HP-UX. Bundled as a configured system,



QMS offers its QMS-PS 2200 printer.

Model 808S is U.S. list priced at $21,950 (U.S. list) and is priced competitively with comparable DEC, IBM and NCR systems.

Create Network Printers With StarSpooler

A new software package from Gandalf Data allows users of IBM and compatible PCs attached to Gandalf networks to share printer resources throughout the network.

The StarSpooler PC software package operates with Gandalf's Starmaster, PACX, XMUX and SMUX systems to provide printer sharing without leaving the application. This ability simplifies access to remote printers and should reduce printer investment, as well as eliminate the need for dedicated printers that only serve a given user population.

StarSpooler software uses only 22 to 30 KB of PC memory, plus a user-definable buffer area. This leaves more memory available for DOS applications in comparison to spooler products that typically require 130 KB of PC memory.

You can change print parameters and determine the status of print jobs without exiting their current applications. You also can facilitate distribution of listings from a shared printer by adding a unique "banner" page to each output as well as a form feed at the end of each printout. When multiple printers are available, you may select the printer most appropriate for the application.

Site license prices are $2,000 per Starmaster network processor or PACX 2000 system; $1,000 per PACX 200 system; and $500 per SMUX or XMUX system.

Contact Gandalf Data Inc., 1020 South Noel Ave., Wheeling, IL 60090; (312) 459-9348.

Circle 383 on reader card

Software Information Now Available On Disc

MENU Publishing has announced the release of IBM ON DISK, a complete source of software information for the IBM PC and compatibles on disc. A quick reference tool, IBM ON DISK contains over 15,000 titles representing more than 2,600 software publishers. It's easy to install and use; simple menus step you through a software search. You perform searches by product category, publisher, ISPN, or title of software program. It comes on seven 5 1/4-inch high-density diskettes or three 4 1/2-inch micro diskettes. Retail price is $39.95.

Contact MENU Publishing, Mayview R.d. at Park Dr., P.O. Box 12800, Pittsburgh, PA 15241; (412) 746-MENU.

Circle 382 on reader card

HP Introduces Nine New Font Cartridges

Hewlett-Packard has added nine font cartridges to the HP LaserJet printer family.

The new cartridges are priced from $99 to $195 and replace all existing cartridges except the HP ProCollection and WordPerfect cartridges.

The cartridges work with the HP LaserJet Series II, IID and 2000 printers. Higher-density ROM (read-only memory) chips allow more

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fonts on a cartridge. The new cartridges contain two to three times as many fonts as the originals and are designed for specific applications including word processing, spreadsheets, presentations, forms and bar codes. Customers now can choose the cartridge that best meets their applications' printing requirements.

Century Software's TERM V6.1 Emulates PC Keyboard Layout

Century Software has announced the new release of its TERM Communications Software that emulates the IBM PC's keyboard layout. TERM V6.1 also becomes the sole asynchronous communications product offering full-color SCO console emulation, above-industry-standard 25-line emulations and the ability to run identically under multiple operating systems.

A communications software that runs identically under multiple operating systems, TERM V6.1 supports UNIX, Xenix, DOS, VMS, BTOS, A/UX, AIX and now Macintosh. Prices of UNIX/Xenix versions start at $350.

Contact Century Software, 5284 South 320 West, Suite 134, Salt Lake City, UT 84107; (801) 268-3088.

Circle 392 on reader card

HP Introduces Dimensional Metrology Software

Hewlett-Packard has introduced the HP 10754A dimensional metrology analysis software for its laser product line.

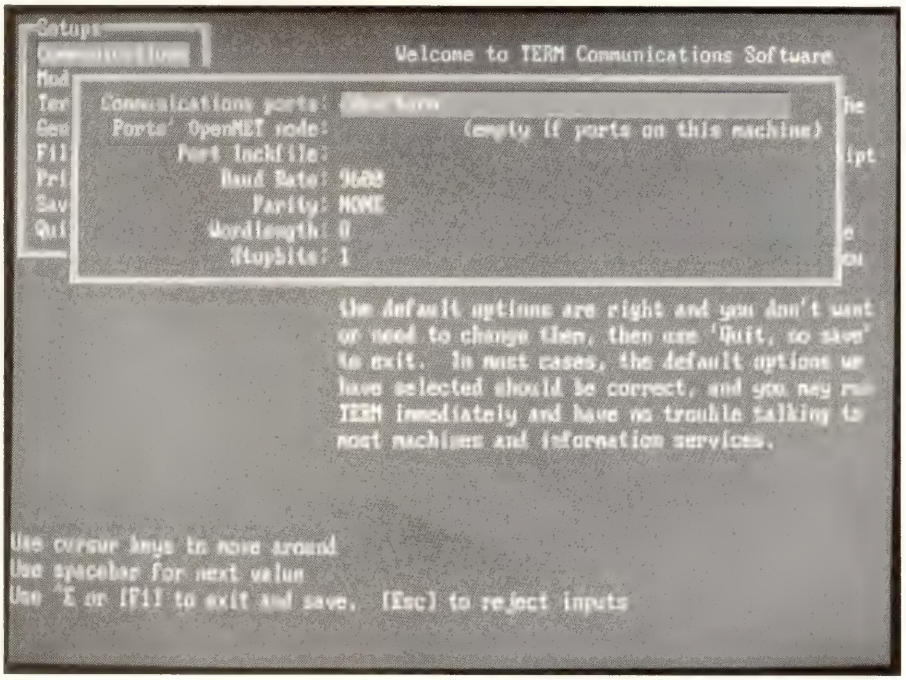
The software provides complete data-analysis capabilities for the industry-proven HP 5528A laser measurement system. The software operates on industry-standard operating systems to allow more flexibility and choice in computer equipment.

The HP 10754A software permits operators of the HP 5528A laser measurement system to collect and process data with computers that use an MS-DOS operating system, including the HP Vectra PC family and others compatible with IBM PC-XT and AT PCs.

Sapiens Software Offers Star Sapphire Common LISP 3.0

Sapiens Software now is shipping Star Sapphire Common Lisp version 3.0. Star Sapphire is one of the few versions of the Common LISP programming language for the IBM PC. Best known for use in artificial intelligence, Common LISP is a general purpose, model programming language.

Star Sapphire LISP supports the use of up to 8 MB of extended or virtual memory. Included



Century Software introduces V6.1 of its TERM Communications Software.

are a resident EMACS editor and online help for the entire language. The built-in incremental compiler and debugger speeds program development. The product includes source code examples, including the Towers of Hanoi and the Colossal Cave Adventure that demonstrate how to write programs in LISP. The product requires an IBM PC, PS/2 or compatible with 640 KB memory and a hard disc. Star Sapphire LISP is available now at $99.95.

Contact Sapiens Software, P.O. Box 3365, Santa Cruz, CA 95063; (408) 458-1990.

Circle 393 on reader card

Switch-It Offers OS/2-like Features

Better Software Technology Inc. (Framingham, MA) has released Switch- It, a task-switching program that allows PC users to switch instantly between up to 100 programs and files and transfer data between them.

Switch-It offers task-switching in an MS-DOS environment. Switch-It swaps out unused programs to hard disc, EMS or extended memory. TSRs or memory resident programs don't take up any RAM because Switch-It loads TSRs in RAM only when they are needed.

Switch-It is designed for novice to intermediate level of PC users in mind. A simple procedure installs Switch-It automatically and builds a list of applications by searching and recognizing most popular programs on the user's hard disc.

Once installed, Switch-It menu pops up every time the PC is turned on. You can select Lotus 1-2-3 and work with his spreadsheet. Pressing a hotkey switches you to WordPerfect. Pressing another hotkey switches you back to Lotus without losing the position in WordPerfect.

Graphics programs using CGA, EGA and VGA adapters and Microsoft mouse are supported by Switch-It. A PC user can have Ventura Publisher, WordPerfect, Lotus 1-2-3 and Freelance, all loaded and available at once. Switch-It also is fully compatible with IBM Token Ring, Novell and other major networks. Contact Better Software Technology Inc., 55 New York Ave., Framingham, MA 01701; (508) 879-0744.

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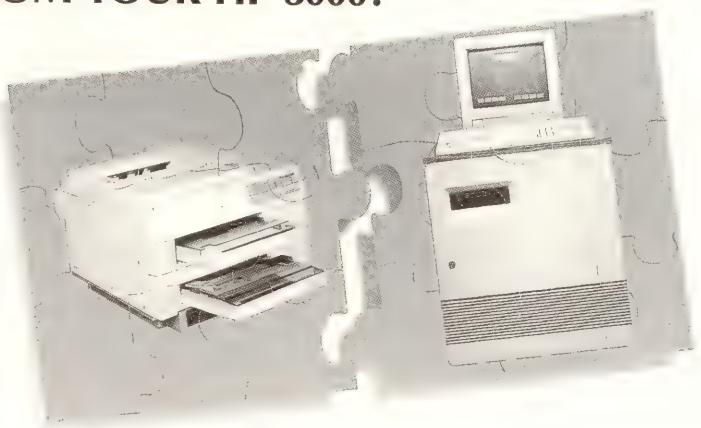

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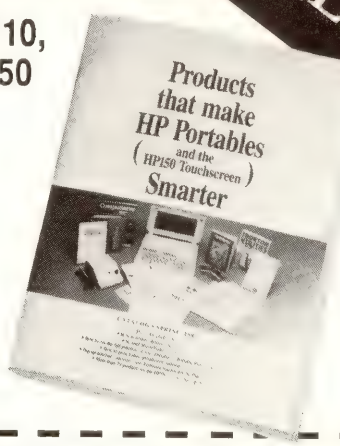

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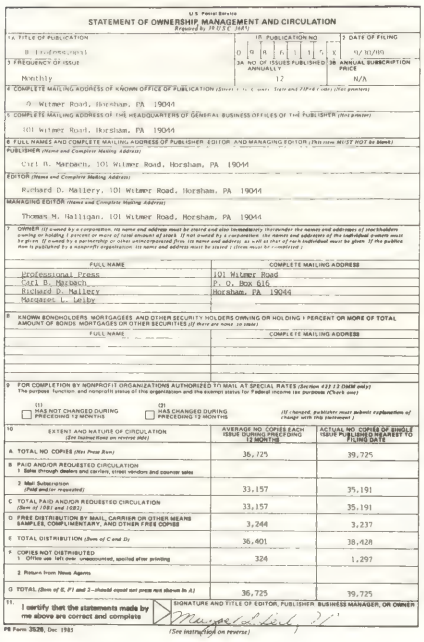

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PS Form 3526, Dec 1985

NEW PRODUCTS

HIBACK/UX Integrates HP Into BACKUP Strategy

Hi Comp has worked with Hewlett-Packard Company to include the new rewritable optical disc drive subsystem, and other HP optical products as they become available, in its BACKUP software strategy to provide a single-vendor solution for network backup on any HP 3000 or HP 9000 system. BACKUP MANAGER has the ability to store and restore data between all systems and has a user interface for MPE V, -XL and HP-UX systems .

The new technology introduces the option of the dedicated backup engine to cut cost and time by fully automating the backup process.

Contact Hi Comp America Inc., 305 Broadway, 4th fl., New York, NY 10007; (212) 732-1946.

Circle 390 on reader card

HP Introduces PC-Based Analyzers

Hewlett-Packard has introduced two PC-based spectrum/network analyzers, the 12.8-kHz HP 3566A and 102.4-kHz HP 3567A. Both programmable analyzers offer built-in time and frequency domain measurements, which can be expanded to 16 simultaneous data-acquisition input channels to reduce overall measurement test time.

The HP 3566A and 3567A share the same measurement feature, which solves mechanical-test, production-test or signal characterization problems. To ensure fast measurement-data processing, a hardware signal- processor module transforms data from time to frequency using the latest FFT hardware technology.

Linked to this module is an IBM PC AT (or compatible) that runs MS-DOS, MS Windows and HP's measurement software. The measurement software contains a windows-based user interface that manually controls the measurement process. For measurement automation, every measurement feature is accessible by program written in a variety of Microsoft-supported programming languages.

For Your Information

■ Processware Inc. (Atlanta, GA) has announced the addition of software porting services to its list of software consulting services. The porting service is intended to assist value-added businesses with converting their software products to HP-UX.

■ Computech Systems Corp. (Redmond, WA) announced the opening of an Eastern regional office. Computech sells and services HP 3000, 1000 and 9000 equipment as well as HP compatibles and accessories.

■ The international association of UNIX systems users, formerly /usr/group, now is officially called UniForum.

■ Peter P. Casey announced that a new company called CADworks Inc. (Cambridge, MA) was formed to develop, market and support computer-aided design software products and services for the facility management, architecture/engineering/construction and mechanical design industries. The company distributes products worldwide through value-added resellers, dealers and distributors.

■ Robert Lund & Associates (Albany, OR) has announced its second round of system performance workshops entitled "Taming the HP 3000 II — a System Performance Workshop Aimed at Helping You Successively Monitor and Manage Your HP 3000's Performance." Because of the personalized nature of the course, seating will be limited. Seminar fee is $895. Workshop dates: Kansas City, MO, Nov. 30/Dec. 1; Dallas, Dec. 7/8; Los Angeles/Orange County, Dec. 14/15; Denver, Jan. 16/17 1990; Albuquerque, NM, Jan. 18/19; Portland, OR, Feb. 19/20; Seattle, Feb. 26/27; San Jose, CA, Feb. 12/13.

For more information call Robert Lund at (503) 327-3800 or FAX (503) 327- 3276.

■ Jobscope Corp. (Greenville, SC) is offering a new brochure, "Arming Market-Responsive Manufacturers With A Competitive Edge" free of charge. The brochure describes how JOBSCOPE enables today's custom manufacturer/service contractor to meet changing market demands through the use of its flexible powerful manufacturing management software. JOBSCOPE is available on the IBM AS/400 and the HP 3000.

■ Unify Corp. (Boston, MA) introduced a Computer Based Training (CBT) package designed to give you an intermediate mastery of Structured Query Language (SQL). Students will be able to create and execute SQL queries, create indexes and tables, conduct table updates and generate formats for reports. The course consists of three 5 1/4-inch diskettes, one 3 1/2-inch diskette, an installation card and a reference manual. ■

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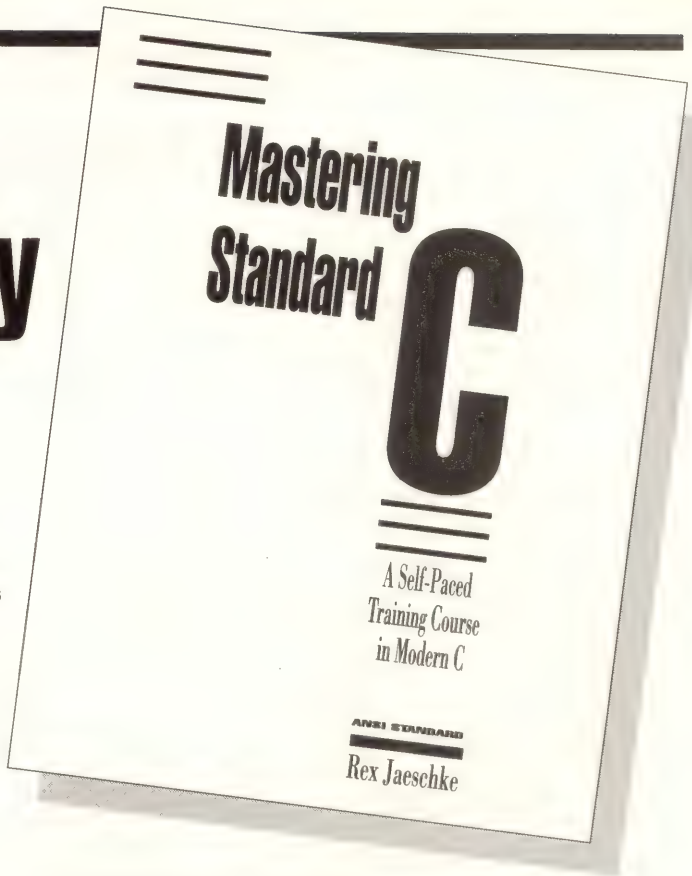

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[NOVEMBER]

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15: BARUG is holding a one-day seminar, "Relational DB and IMAGE." Cost $30. Call (415) 674-3421.

15: NECRUG is holding its Winter Quarterly Meeting at the Wilmington Hilton Hotel, I95 and Naamans Rd, Claymont, DE. Topic: Automated Data Collection. Contact Richard Weller (215) 750-1438 or John Werner (302) 239-2220.

27-29: German HUG is holding its fall conference in Cologne, W. Germany. For information, call Dieter Grey 49/711/246321 or fax: 49/711/232563.

[DECEMBER]

5: MTLRUG is holding its quarterly meeting at the Dorval Airport Hilton, Canada. Call Mich Kabay (514) 931-6187.

11-13: The Fifth Annual Access Technology 20/20 Users' Group is being held at the Hynes Convention Center in Boston, MA. Call Karen Smith, Rosemary Walsh or Joanne Knowlton (508) 655-9191.

13: NTRUG is holding a conference and vendor show at the Dallas Grand Kempinski Hotel in Dallas, TX. Call Greg Johnson (214) 956-3753.

14: INRUG is holding its bimonthly meeting at the HP office in Carmel, IN. Contact Dave Largent (317) 284-4461.

[JANUARY]

23-25: The 7th Annual UniForum (International Conference Of UNIX Operating Systems Users) is being held at the Washington DC Convention Center. For information call (800) 323-5155, in Illinois (312) 299-3131.

[MARCH]

19-22: The National Computer Graphics Association (NCGA) is holding a conference and exposition at the Anaheim Convention Center, Anaheim CA. Call Michael Weiner (703) 698-9600.

[APRIL]

8-10: BWRUG is holding Fourth Atlantic Conference at Rosslyn Westpark Hotel, Arlington, VA. Registration fee $175. Call (301) 242-6777.

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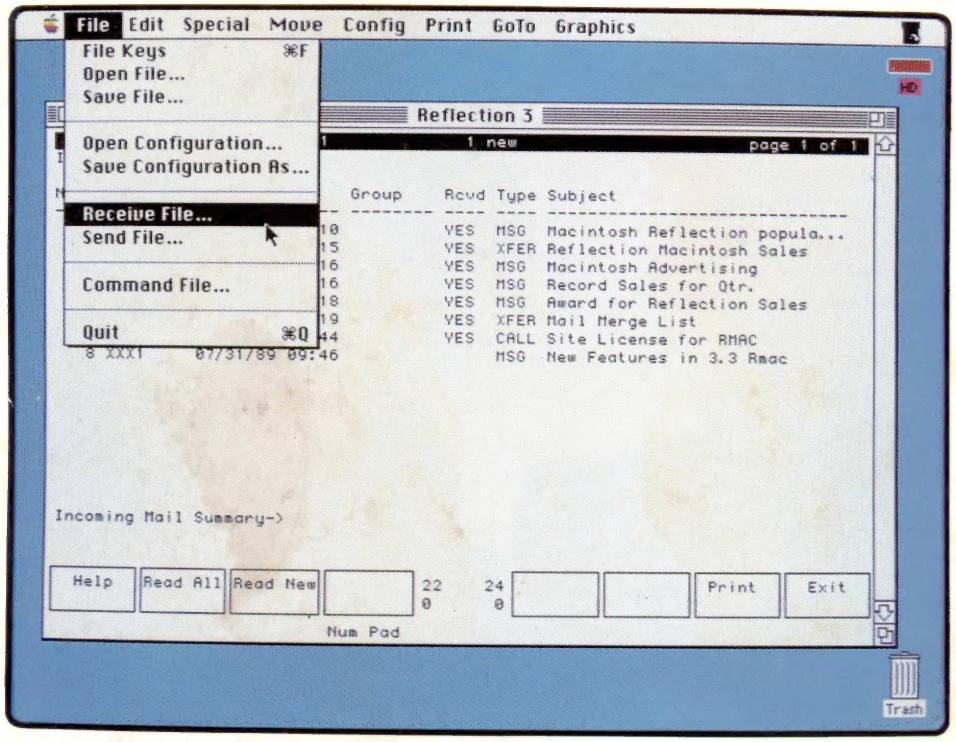

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